the OIL AND GAS JOURNAL

MISSION Rotary Hand Slips

MISSION "Super-Service" Slush Pump Liner

MISSION Tubing Spiders

MISSION "Silver Tap" Slush Pump Valve

MISSION SALUTES the A. P. I.

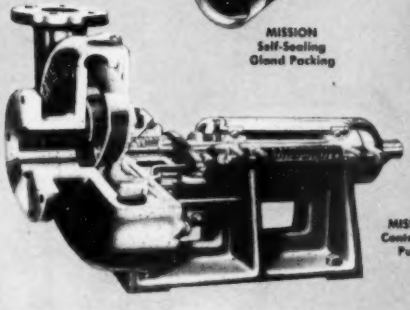
In its brief 32-year history this great organization has saved the Oil Industry and the consumers of oil products untold millions of dollars—through its programs of standardization, efficiency, reduction of waste and corrosion, safety—and through its all-round activity in the many-sided operations of the Industry.

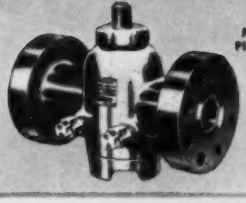
MISSION "Super-Service" Slush Pump Valve

MISSION Slush Pump Piston and Rod

MISSION Self-Sealing Gland Packing

MISSION MANUFACTURING CO.
HOUSTON, TEXAS


MISSION Centrifugal Pump

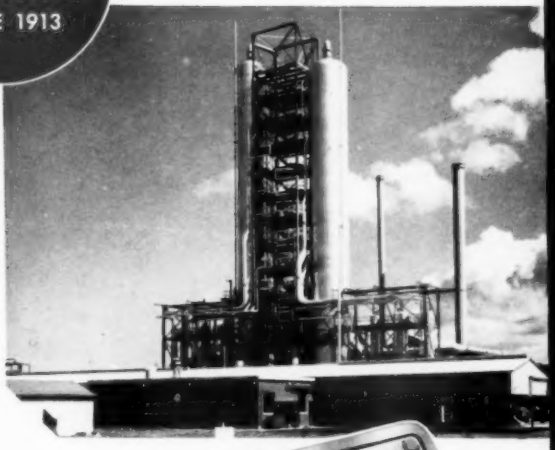

MISSION Plug Valve

MISSION Valveless Swab

PRICE 50 CENTS TABLE OF CONTENTS PAGE 25 NOVEMBER 1, 1951

PETROLEUM'S FAMILY ALBUM

STEEL PLATE FABRICATORS AND ERECTORS SINCE 1913



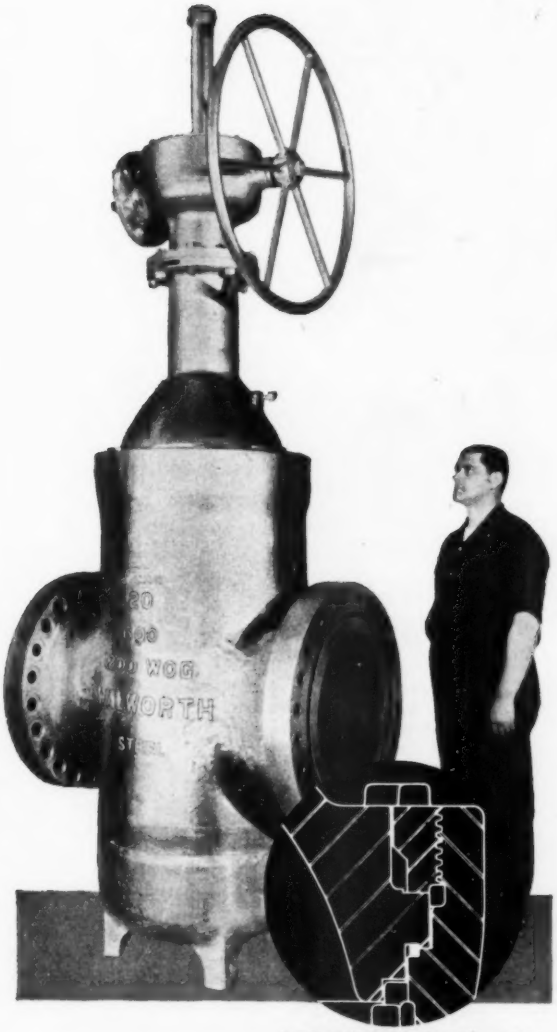
Wyatt's

HOUSTON - DALLAS - NEW YORK - TULSA

• PUTTING NATURAL RESOURCES TO WORK FOR MODERN INDUSTRY

Announcing the New WALWORTH TYPE 49 Steel Pipe Line Gate Valve

(PATENT APPLIED FOR)



Detail of Boltless Body-to-Bonnet Joint

These new Walworth valves have been designed on the through-port principle, with body and disc ports accurately indexed, and body ports bored to match connecting piping. These valves have no recesses to accumulate dirt and no obstructions to interfere with the free flow of liquid or passage of pigs or scrapers. Furthermore, these valves do not require any internal lubrication and may be installed without regard to flow direction. Walworth Type 49 Steel Pipe Line Gate Valves are made in sizes up to and including 30" in Series 400 and 600. Valves have stellite seat rings, and the body-to-bonnet joint incorporates a Walworth boltless design. A detailed illustration of this joint is shown here.

For further information about these new Type 49 Steel Pipe Line Gate Valves, contact your nearest Walworth distributor.

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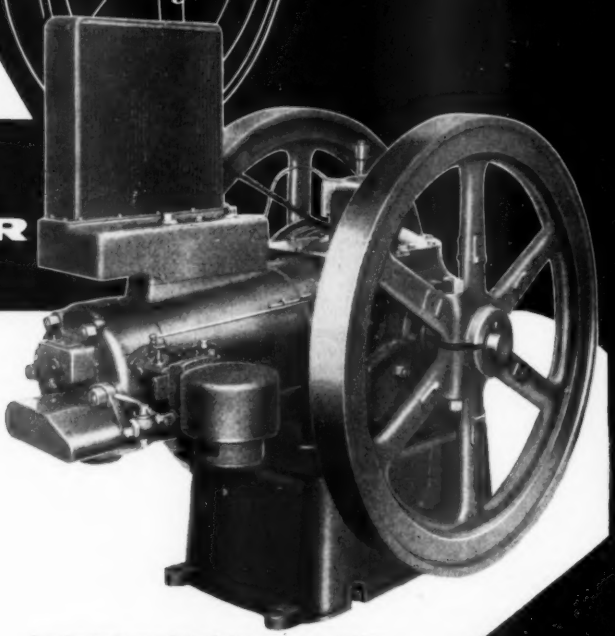
THIS BALANCE ...IS IN YOUR FAVOR



An outstanding performance advantage of the Fairbanks-Morse "ZC" is the *balanced* power output you get with the TWO big flywheels located between the engine and the pumping gear unit. And with TWO flywheels, you can drive from either side of the engine.

Load fluctuations are "smoothed out" by the properly proportioned flywheels, while the power of the engine remains constant. The flywheels store excess energy on the down stroke of the rods . . . then use this stored energy to equalize the load at the peak demand of the up stroke. You not only get smoother pumping . . . you protect engine and driven equipment against overload and abuse.

For the complete story on the "ZC," and the broad range of sizes, see your local supply store or write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

Two flywheels mean better balance . . . more stability on the mounting pedestal. No chance with a "ZC" for unbalanced flywheel effect to cause the engine to work loose from its mounting.

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a name worth remembering

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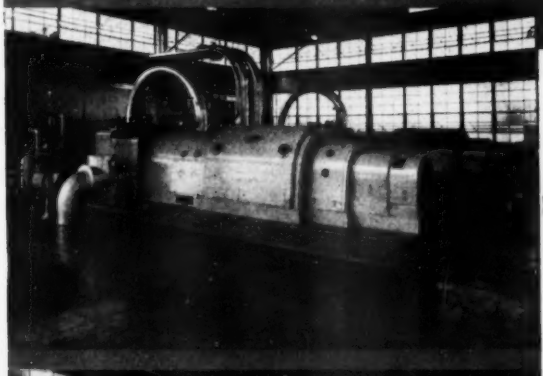

THESE FLOORS ARE KEPT CLEAN AND SAFE BY THE MULTI-CLEAN METHOD

A noticeable characteristic of plants like the above is the immaculately kept floors and all around good housekeeping. These beautiful floors are typical examples of what the Multi-Clean Method is accomplishing in plants of the Petroleum Industry all over the country. Their luxurious finish, obtained through application of Multi-Clean approved floor liquids, is non-slip, making floors safe to walk on and work upon. This finer floor care improves working conditions, stimulates employe morale and is a distinct public relations asset.

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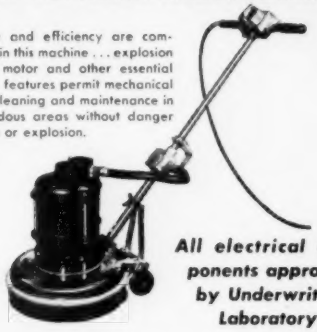
Safety and efficiency are combined in this machine . . . explosion proof motor and other essential safety features permit mechanical floor cleaning and maintenance in hazardous areas without danger of fire or explosion.



All electrical components approved by Underwriters Laboratory.

SAVES TIME AND LABOR ASSURES UTMOST SAFETY

The Multi-Clean Explosion Proof Floor Machine gets better results faster . . . more safely. Man hours required are reduced over slow and expensive hand labor by cleaning with the one-man machine method. Floors are made safer by the thorough cleaning action which removes all accumulations of grease, chemicals, or other dangerous materials. And the Multi-Clean Method beautifies floors, makes them longer-lasting, protects them against wear and corrosion.

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Gentlemen: Please send me further information on the Multi-Clean Explosion Proof Floor Machine and the Multi-Clean Method.

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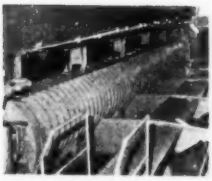
Water diet for stronger pipe



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Type	Diameter	Length	Wall Thickness	Shipping Point
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Continuous Weld—Plain End	2⅜" to 4½" O.D.	Up to 40'	Standard	Fontana, Calif.
Electric Resistance and Fusion Weld—Plain End	8⅝" to 22" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser
Electric Resistance Weld—Plain End	5⅝" to 12¾" O.D.	Up to 55'	.188" to .400"	Fontana, Calif.
Electric Fusion Weld—Expanded—Plain End	24" to 30" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser

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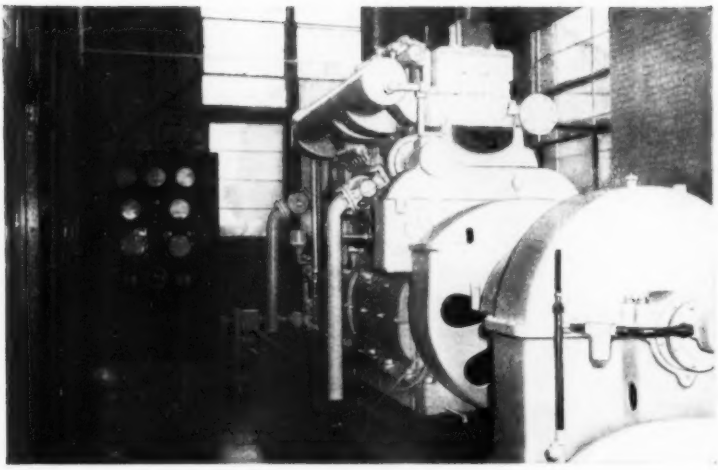


21,716 hours without forced shutdown

...and still going strong

that's the record of this Alco Diesel Engine at Barnett Station of Shell Products Pipe Line

Listen to Mr. C. C. Curvey, chief operator at Barnett, Ill., speaking:

"The unit operates 24 hours a day and is never shut down except for the annual routine inspection and overhaul. . . . Not only have we boosted capacity of this line 15%, but operating and maintenance costs have been much reduced."

The Barnett station is equipped with a single Alco diesel—replacing a total of 3 old-type engines. This rugged Alco diesel provides power for pumping 1,050,000 barrels a month through the 8-inch pipe line. It's a 6-cylinder, 4-cycle engine with 12½ inch bore and 13 inch stroke, rated at 810 hp and 650 rpm.

Such power and performance can be yours, too, if you install Alco Diesel Engines to meet your pipe line pumping requirements. Your nearest Alco engineer will be glad to help. Call him today at sales offices in New York, Beaumont, Chicago, Cleveland, Houston, Kansas City, San Francisco, Schenectady, St. Louis.

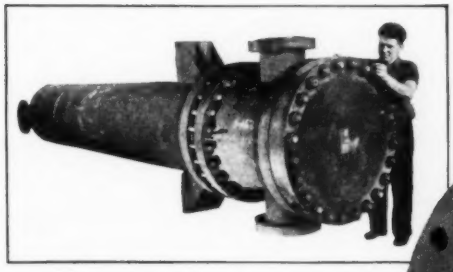
SPEED Vs. WEAR

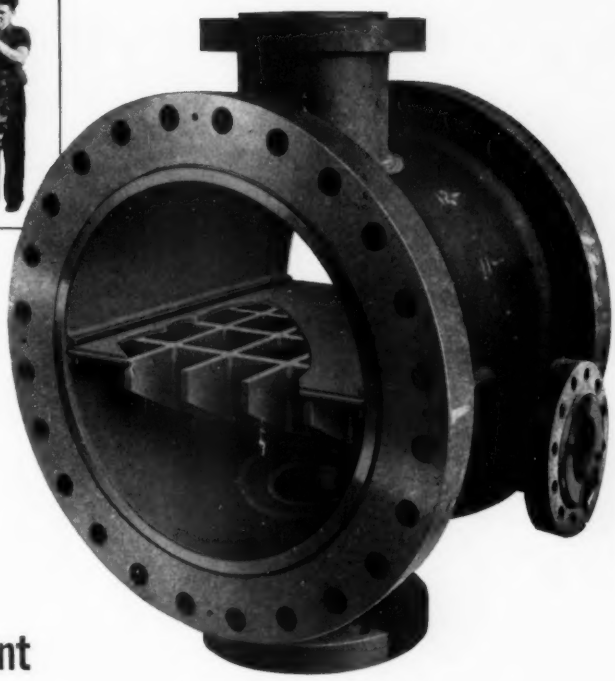
Remember, since piston speed and journal travel per minute are both almost the same in medium speed and slow speed engines, wear is equivalent as well. Not only do you get unequalled dependability with Alco Diesels—you get long wear and low maintenance costs, no matter how difficult the service conditions.

ALCO DIESELS

THE MARK OF MODERN ENGINEERING

AMERICAN LOCOMOTIVE COMPANY





High-level reactor exchanger built for one of the world's largest Ethanol plants, showing copper-lined channel and removable copper pass rib with unusual reinforcement designed to give support against high pressure drop at elevated temperatures.

How A.O.Smith protected heat transfer equipment from the effects of Phosphoric Acid Corrosion and Hydrogen Diffusion

The problem was solved for Stone & Webster Engineering Corporation of Boston, engineers and designers of the Chemical Project of the British Petroleum Chemicals, Ltd., at Grangemouth, Scotland, with this deoxidized copper-lined, high-level reactor exchanger.

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Our welding laboratories then determined procedures to be used in the shop for welding copper to copper, copper to steel, and silver-soldering copper to steel.

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A.O. Smith has been retained as consultants on today's most complex heat transfer problems and the facilities employed in solving them are available to you.

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WILSON is the Driller's rig — the rig with tomorrow's features — TODAY!

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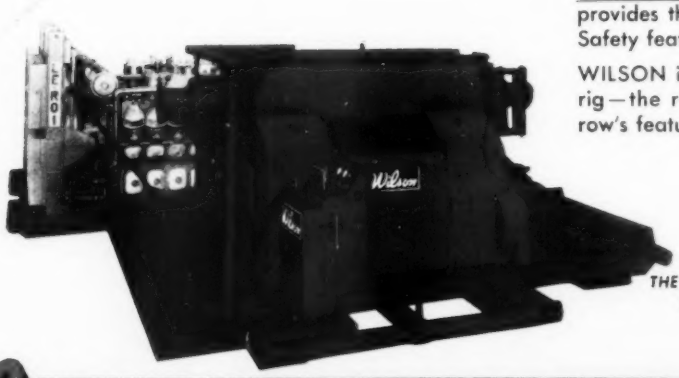


THE NEW WILSON TITAN RIG

Wilson MANUFACTURING CO., Inc.

WICHITA FALLS, TEXAS

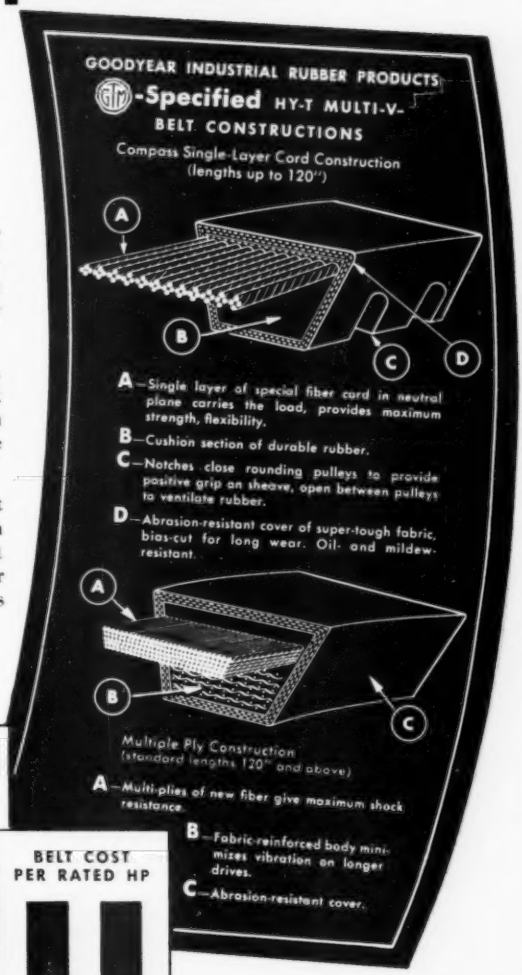
No other V-Belt matches Goodyear's Super-Rated HY-T

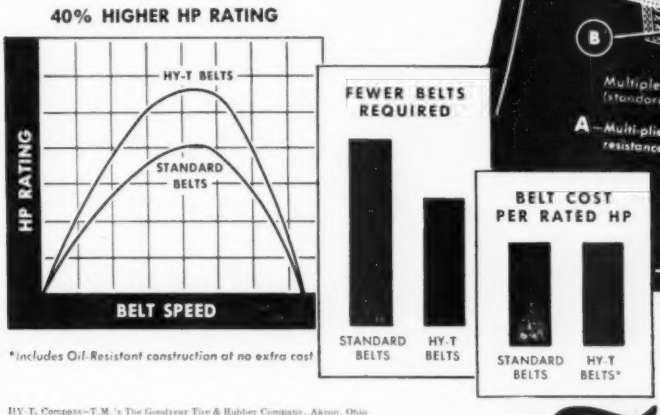
For Shock-Resistance
For Long Life
For Hard Work

NO other belt can match Goodyear's new HY-T Multi-V-Belt. Goodyear gives you a belt made with new chemically produced fiber that forms the load-carrying cords of these belts, provides greater strength and higher horsepower rating.

It has the strength of nylon—without its stretch. That means a super-rated V-Belt that will "soak up" the heaviest shock loads—last far longer than ordinary construction V-Belts even under extreme heavy-duty service.

Look at the charts here. See for yourself what HY-T Belts will do for you on your V-Drives. Then ask the G.T.M.—Goodyear Technical Man—about matched sets for your multi-drives. Or see your nearest Goodyear Industrial Rubber Products Distributor.


GOODYEAR INDUSTRIAL RUBBER PRODUCTS
GM-Specified HY-T MULTI-V-BELT CONSTRUCTIONS
Compass Single-Layer Cord Construction
(lengths up to 120")
A
B
C
D
A—Single layer of special fiber cord in neutral plane carries the load, provides maximum strength, flexibility.
B—Cushion section of durable rubber.
C—Notches close rounding pulleys to provide positive grip on sheave, open between pulleys to ventilate rubber.
D—Abrasion-resistant cover of super-tough fabric, bias-cut for long wear. Oil- and mildew-resistant.
Multiple Ply Construction
(standard lengths 120" and above)
A—Multi-plies of new fiber give maximum shock resistance.
B—Fabric-reinforced body minimizes vibration on longer drives.
C—Abrasion-resistant cover.



*Includes Oil-Resistant construction at no extra cost

FOR HOSE, FLAT BELTS, V-BELTS, MOLDED GOODS, PACKING, TANK LINING, RUBBER-COVERED ROLLS built to the world's highest standard of quality, phone your nearest Goodyear Industrial Rubber Products Distributor.

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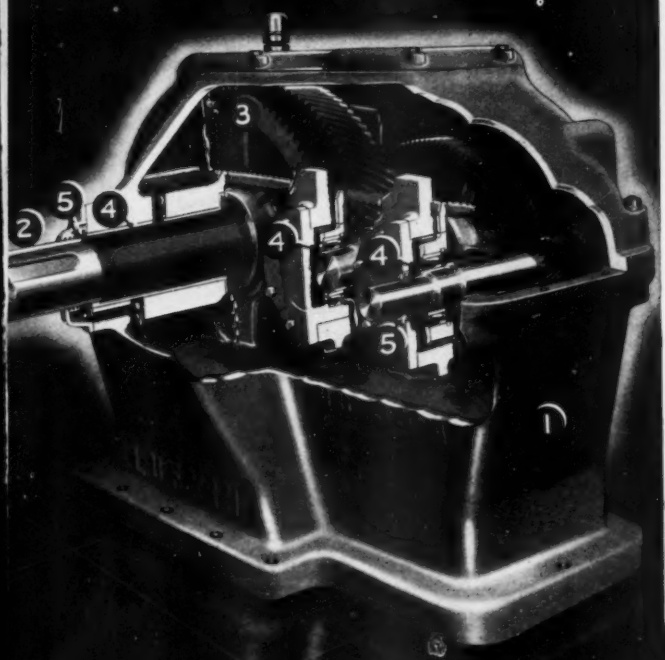
The Lufkin

Gear Box lubrication System . . .



The heart of an oil field pumping unit is the gear reducer. Pumping service is generally considered to be one of the toughest applications for gears. Lufkin's total output of gear reducers in this class is now over thirty thousand units. Here are the reasons Lufkin is still first in oil field reducers:

1. The Lufkin reducer housings are of rugged construction and especially built for oil well service.

2. All shafts are forged from alloy steel which is heat treated and precision ground.

3. Gears which are precision cut on our Sykes Herringbone machines are used exclusively in Lufkin Units. These gears operate in an oil bath with gear wipers to flood the bearings.

4. Lufkin uses oversize bronzoid bearings on crankshafts and the crankshaft is held rigid by hub plates on the bearing. The pinions float on Hyatt Hy-Load Roller Bearings.

5. The pinion shaft bearings are equipped with patented oil seals, to prevent oil leaks; while the main crankshaft is equipped with collar oil slingers and annular grooved drain covers.

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LUFKIN, TEXAS

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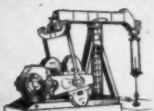
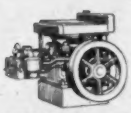
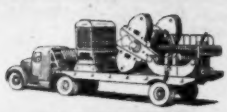


LUFKIN PUMPING UNITS



LUFKIN-COOPER-BESSEMER ENGINES



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DIVISION LUFKIN FOUNDRY & MACHINE COMPANY INDUSTRIAL, MILL AND AUTOMOTIVE SUPPLIES

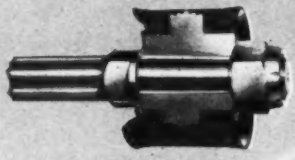
For all IDEAL pumps and pumps of other manufacture

IDEAL Valves and Seats for maximum fluid flow.

"Nationaloy" liners for regular service.

API Rods
"Blue-Stripe" rods both API & GT for regular service.

V-Ring Packing.



"GT" Pistons and rods for higher pressures, more severe service.

"Blue-Chrome" rods for highly corrosive conditions.

Cap and Head Gaskets.

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IDEAL fluid end parts are always available at your National Supply Store

The familiar Blue-and-Yellow label identifies these IDEAL Fluid End Parts at your National Supply Store. Readily available for IDEAL pumps and pumps of other manufacture. Check on your requirements with the National Supply representative, or write for catalog 357-A.

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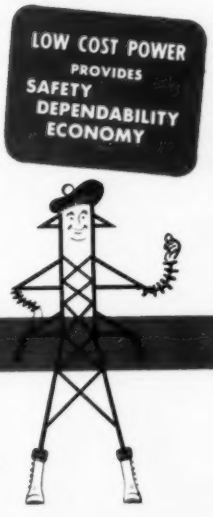
*PEP — Purchased Electric Power



Petroleum Electric Power Association

ORGANIZED IN THE INTEREST OF GREATER SERVICE TO THE PETROLEUM INDUSTRY

CALL YOUR NEAREST ELECTRIC SERVICE COMPANY FOR MORE FACTS
OR ADDRESS YOUR REQUEST TO P. O. BOX 2771, DALLAS, TEXAS

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AND WHAT THEY MEAN TO YOU

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Our 82 stores in the United States and Canada, plus 17 sales offices and 6 resident salesmen, form a market desirable to major manufacturers and give us a close check on the performance of supplies and equipment internationally.

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General Offices: TULSA, OKLAHOMA

J&L STEEL

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They Say—

"Common-Carrier Fetish"

Sir:

Re your August 16, 1951, editorial entitled "Common - Carrier Fetish," the writer, an independent producer and operator, always accepted your statements and editorials to the effect that you were in favor of and supporting our free enterprise and competitive system. We thought you were sincere, that those statements were your actual convictions; therefore it was very surprising and amazing to note your inconsistent attitude in now openly supporting the monopolistic policies of the big gas-pipe-line companies. . . .

For over 25 years now, most independent operators who developed a gas area (especially in the intermountain region) were penalized because they had no definite or assured market for gas, were prevented from transporting and selling same. This monopolistic situation resulted in the drying up of practically all drilling for gas, this in turn resulted in a shortage, so that a few years ago the consumers in western North and South Dakota and eastern Montana were being cut off, or deprived of natural gas, solely as the result of the 25 years of monopoly unlawfully maintained by the Montana-Dakota Utilities Co.

Who can gainsay that, as, if and when these gas pipe lines are compelled to comply with our laws and to operate as common carries, we may not see the greatest expansion of the gas business the world has ever known? Really, what difference should it make to a pipe-line company whether it makes the legal limit of 6½ per cent profit in the distribution of gas, in the production of gas, or in the transportation of gas for others. . . .

John Wright, vice president,
Mondakota Gas Co.,
Billings, Mont.

Iranian Loss Being Met

"Already the crude oil lost in Iran has been made up by increased production in the United States itself, in the Middle East, and in South America. The loss of the refinery at Abadan presented a greater problem, but that is being met by increased operating rates at present refineries and by building up refining capacity both in the U. S. and in Europe.

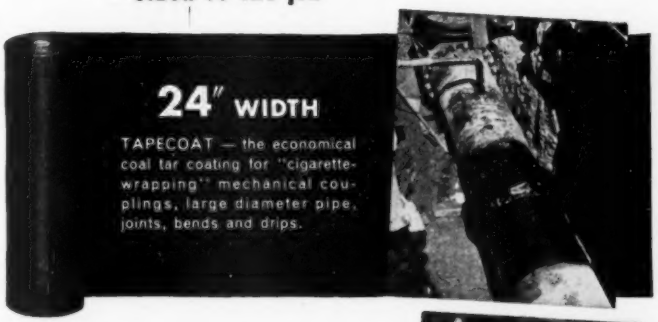
"It appears to use, however, that demands will be met this coming winter, although the supply and demand relationship may become rather tight if Abadan stays down and if

CUT CORROSION PROBLEMS DOWN TO SIZE...

WITH TAPECOAT*

—the Coal Tar Coating in Handy Tape Form

—Sized to the job



24" WIDTH

TAPECOAT — the economical coal tar coating for "cigarette-wrapping" mechanical couplings, large diameter pipe, joints, bends and drips.

18" WIDTH

TAPECOAT—the practical coal tar protection for "cigarette-wrapping" of large couplings, pipe bends, and joints on large diameter pipe.

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TAPECOAT — the distinctive, time-tested coal tar tape for spiral-wrapping welded field joints, service connections, pipe under streets and sidewalks, and pipe through building walls.

For more than 10 years, Tapecoat engineers have specialized in pipe joint protection. Call on them to help you meet your individual requirements. Write today for complete details.

The* TAPECOAT *Company

Originators of the Coal Tar Tape for Pipe Joint Protection

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*Reg. U.S. Pat. Off.

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..Give you- DOUBLE MILEAGE, DOUBLE TRACTION, DOUBLE SAFETY!

Carry TM Carbon Steel Tow Chains with grab hooks on each end.

TM Bar Reinforced Tire Chains help keep oil well production on schedule in spite of sloppy and otherwise impassable terrain. Rugged, heavy-duty construction with patented, double-welded reinforcing bars gives you twice the traction, twice the mileage of regular twist-link types. And you get twice the safety, too! Available for passenger cars and single or dual wheel trucks. TM means *tire chain economies for you!* Order yours today!

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TM Bar Reinforced Dual Wheel Truck Chains with triple side chains.

TAYLOR MADE
A GREAT NAME IN
Chain SINCE 1873

our own domestic demand continues to increase.

"I am assuming that the industry will get a fair share of vital materials, especially steel; that price regulations will be administered so as to encourage and not retard oil expansion; that our industry will not be subjected to punitive taxation; that earnings will be sufficient to enable us to continue necessary expansion; and, most of all, that competitive enterprise will continue without further restriction.

"Gasoline today is 50 per cent more efficient than the gasoline of 25 years ago, yet today's, gasoline prices, excluding taxes, are actually lower than in 1926. Or, to look at it another way, Bureau of Labor Statistics figures show that, compared with 1935-39, the average price of commodities has risen 86 per cent and our petroleum prices at retail have risen only 56 per cent."

A. L. Nickerson, director, Socony-Vacuum Oil Co., Inc., before Oil Progress Week Meeting in Cleveland.

L.P.G. Vapor Pressure

Sir:

L.P.G., a product and industry closely allied with the gasoline industry, nevertheless has distinct parlance and test specifications of its own.

The editorial significance of R.v.p. (Reid vapor pressure) is undoubtedly limited to meaning vapor pressure only. Technically, however, R.v.p. is a very specific terminology. According to A.S.T.M. D-323-50 "this method of test is intended for the determination of the vapor pressure of volatile, nonviscous petroleum products, except liquefied petroleum gases (L.P.G.).

When completed an L.P.G. vapor pressure determination is the gage vapor pressure of the L.P.G. in pounds per square inch gage at 100° F. and is reported as the L.P.G. vapor pressure without reference to temperature or unit of surface. R.v.p., on the other hand, is approximately the absolute vapor pressure of the product in pounds per square inch at 100° F. and likewise is reported without reference to temperature or unit of surface, but, as R.v.p.

Obviously therefore, R.v.p. is one vapor pressure, applicable to a given range of products, and L.P.G. vapor pressure is another applicable to liquefied petroleum gases.

Joe F. Wood,
Skelly Oil Co.,
Pawhuska, Okla.

Editor's note:

Mr. Wood, who is chairman of the technical committee of the Natural Gasoline Association of America, calls attention to a frequent misuse of the designation of vapor pressure of L.P.G. The Journal and others in the industry have, on occasion, expressed L.P.G. vapor pressure in terms of R.v.p. although, as Mr. Woods points out, this is improper.

Newly designed one-piece packing rubber molded from special compound gives positive pack-off, yet pulls easily and will not vulcanize to casing wall.

Two-piece "G2" rubbers with metal spacer are interchangeable and optional at no extra cost if desired.

CIRCULATE ABOVE THE PACK-OFF WITH *New* GUIBERSON *KV30P*

Perforated-Mandrel Control Head Packer

The KV30P is designed especially with a perforated mandrel for free fluid circulation ***ABOVE*** the packer when valve is open. Special seal in shell prevents circulation through the packer shell. Positive pack-off is obtained when valve is closed. Two independent sealing elements in the valve, a tapered metal valve and seat and a set of oil-resistant seal rings, afford double-sealed protection.

Both the KV30P and the regular KV30 allow a 30" opening valve stroke before packer setting is disturbed. Use the KV30 or the KV8 for standard below-packer circulation. The KV8 is the same packer as the KV30 but with 8" valve stroke. All three packers have the same husky construction, varying only in point of circulation and length of valve stroke.

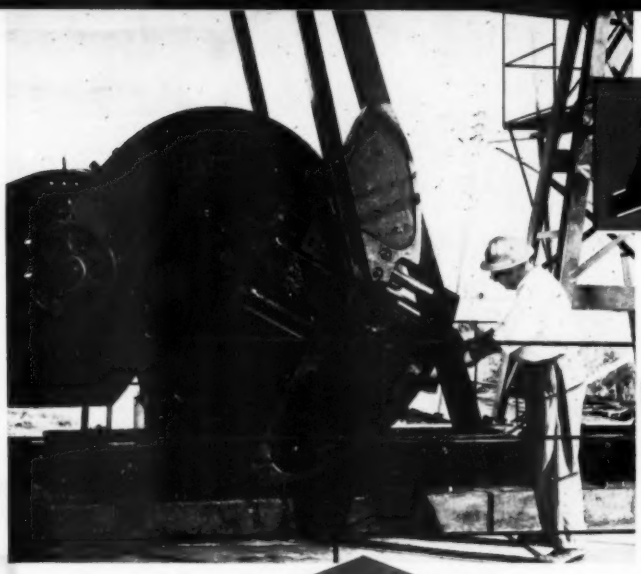
With these KV Packers you can *conserve* gas pressure... *extend* the flow life of your well and produce at *lower lift cost*.

Better Be Safe Than Sorry!

THE GUIBERSON CORPORATION

ESTABLISHED 1919 • DALLAS, TEXAS, U. S. A.

Sold By Leading Oil Field Supply Stores Everywhere



It's New

Safe Speedy and Simple

THE HAPPY ADJUSTOCRANK*

Yes, production men agree that it is the safest, speediest and simplest pumping unit crank yet devised. The HAPPY ADJUSTOCRANK does not have machined dove-tail joints, racks and pinions, or other design arrangements which might allow heavy weights to slip or require bars, sledges, or other tools and extra men, to adjust the position of the movable weights.

- Inward or outward movement of the weights is guided on a round steel bar.
- An acme threaded screw actuates location of weights for any desired range of rotary balance.
- Only a few minutes time is required to slack-off 4 clamping nuts, position one pair of weights, and reset 4 clamping nuts. Only one man necessary.

In the outermost position, the weights and crank of the HAPPY ADJUSTOCRANK amply clear the bottom plane of the 12" main skids. The ADJUSTOCRANK, in combination with natural law beam balancing, is incorporated in the entire advanced line of HAPPY TS Series Single Reduction Pumping Units.

*Patent Applied for

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BWH Industrial Hose
Happy Coolers
Rubber Belting
Leather Belting
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Sure-Grip Sheaves
P & H Engine Starters
Safety Switches
Happy Pumping Units
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TULSA, OKLAHOMA

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Wichita ..... Kansas

CALENDAR

November

Louisiana-Arkansas Division, Mid-Continent Oil and Gas Association, twenty-ninth annual meeting, Roosevelt Hotel, New Orleans, November 1-2.

American Association of Petroleum Geologists, Society of Exploration Geophysicists, and Society of Economic Paleontologists and Mineralogists, annual joint meeting, Pacific sections, Ambassador Hotel, Los Angeles, November 1-2.

American Institute of Mining and Metallurgical Engineers, sixth annual off-the-record meeting, Petroleum Branch, Pittsburgh section, William Penn Hotel, Pittsburgh, November 2.

American Petroleum Institute, thirty-first annual meeting, Stevens Hotel and Palmer House, Chicago, November 5-8.

Southwest Research Institute, second conference on coastal engineering, Rice Hotel, Houston, November 7-10.

American Society for Testing Materials, southern California district, Los Angeles, November 8.

Gulf Coast Association of Geological Societies, first annual meeting, Roosevelt Hotel, New Orleans, November 15-17.

Rocky Mountain Oil and Gas Association annual meeting, Cosmopolitan Hotel, Denver, November 15-17.

Petroleum Electric Power Association, twenty-third annual meeting, Shamrock Hotel, Houston, November 19-20.

Society of Exploration Geophysicists regional meeting, Baker Hotel, Dallas, November 19-20.

Natural Gasoline Association of America, Panhandle-Plains regional meeting, Herring Hotel, Amarillo, Tex., November 20.

Mid-Continent Oil and Gas Association, annual board of directors meeting, Tulsa Club, Tulsa, November 20.

American Society of Mechanical Engineers, annual meeting, Chalfonte-Haddon Hall, Atlantic City, November 25-30.

Twenty-third Exposition of Chemical Industries, Grand Central Palace, New York City, November 26-December 1.

December

American Institute of Chemical Engineers annual meeting, Chalfonte-Haddon Hall, Atlantic City, December 2-5.

Chemical Specialties Manufacturers Association, thirty-eighth annual meeting, Mayflower Hotel, Washington, D. C., December 3-4

Interstate Oil Compact Commission, annual meeting, Hotel Marion, Little Rock, Ark., December 11-12.

American Association for the Advancement of Science, annual meeting, Philadelphia, December 27-28.

1952 Meetings

January

Society of Automotive Engineers, annual meeting, Hotel Book-Cadillac, Detroit, January 14-18.

February

American Society for Testing Materials, Committee D-2 on petroleum products and lubricants, Shoreham Hotel, Washington, D. C., February 3-8.

Missouri Petroleum Association, annual convention and trade exhibit, Jefferson Hotel, St. Louis, February 4-6.

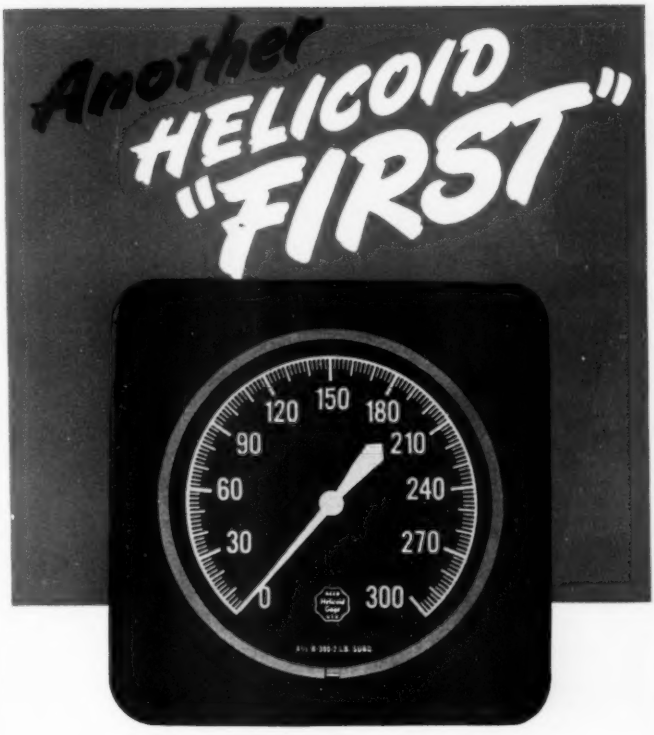
American Petroleum Institute, Division of Marketing, lubrication-committee meeting, Hotel Book-Cadillac, Detroit, February 18-19.

Wisconsin Petroleum Association, twenty-sixth annual convention and equipment show, Milwaukee Auditorium, Milwaukee, February 26-27.

American Association of Petroleum Geologists, Rocky Mountain Section, second annual convention, Salt Lake City, February 28-29.

March

American Society for Testing Materials, spring meeting, Hotel Statler, Cleveland, March 3-7.



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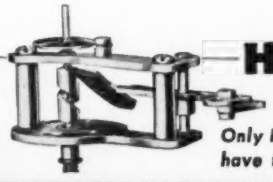

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Only Helicoid Pressure Gages have the Helicoid Movement

ACCO

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Standard worm gearing and standard speed reducers, or specially engineered units to meet any machinery manufacturer's requirements, are Cleveland's business.

When you want the finest, specify "Cleveland"

● When you specify or buy a drive for a machine, conveyor, or other motor-operated equipment, ask yourself these questions:

Does this drive have a performance record for trouble-free, efficient service?

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Is its life unlimited, making replacement unnecessary?

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Because for nearly 40 years Cleveland has answered all these questions with a "Yes", you'll find Cleveland worm gearing and Cleveland worm gear speed reducers on thousands of the toughest drive jobs in industry. That's why Clevelands are preferred—known as the finest among fine worm gear drives.

Write for the new Cleveland catalog, showing all the types and sizes of Cleveland Worm Gear Speed Reducers now available. The Cleveland Worm & Gear Company, 3286 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

American Petroleum Institute, Division of Production, southwestern district, Washington-Youree Hotel, Shreveport, March 5-7.

National Association of Corrosion Engineers, eighth annual conference and exhibition, Galvez Hotel, Galveston, Tex., March 10-14.

American Institute of Chemical Engineers, regional meeting, Atlanta, March 16-19.

American Petroleum Institute, Division of Production, Mid-Continent district meeting, Broadview Hotel, Wichita, Kans., March 19-21.

Western Petroleum Refiners Association, annual meeting, Plaza Hotel, San Antonio, March 31-April 2.

April

American Petroleum Institute, Division of Production, eastern district, Hotel William Penn, Pittsburgh, April 2-4.

Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, April 8-10.

American Institute of Electrical Engineers, District 7 meeting, Hotel Jefferson, St. Louis, April 15-17.

American Petroleum Institute, Division of Transportation, pipe-line conference, Blackstone Hotel, Fort Worth, April 21-23.

American Petroleum Institute, Division of Production, Rocky Mountain district, Gladstone Hotel, Casper, Wyo., April 24-25.

Southern Gas Association, annual convention, Galveston, Tex., April 28-30.

American Institute of Electrical Engineers, District 1 meeting, Binghampton, N. Y., April 30-May 2.

May

American Geophysical Union, thirty-third annual meeting, National Academy of Sciences, National Research Council, Washington, D. C., May 5-7.

American Institute of Chemical Engineers, regional meeting, French Lick, Ind., May 11-14.

American Gas Association, Natural Gas Department spring meeting, Biltmore Hotel, Los Angeles, May 12-13.

American Petroleum Institute, Division of Refining, seventeenth midyear meeting, San Francisco, May 12-15.

American Petroleum Institute, Division of Production, Pacific Coast district, Biltmore Hotel, Los Angeles, May 15-16.

American Petroleum Institute, Division of Marketing, midyear meeting, Copley Plaza Hotel, Boston, May 19-20.

Gas Appliance Manufacturers Association, annual meeting, Broadmoor Hotel, Colorado Springs, Colo., May 21-23.

American Gas Association, production and chemical conference, Hotel New Yorker, New York, May 26-28.

June

Pennsylvania Grade Crude Oil Association, annual meeting, Hotel William Penn, Pittsburgh, June 5-6.

Canadian Gas Association, Chateau Frontenac, Quebec, June 8-12.

American Petroleum Institute, midyear standardization meeting, Brown Palace Hotel, Denver, June 9-14.

American Society for Testing Materials, annual meeting, Hotel Statler, New York, June 23-27.

American Institute of Electrical Engineers, summer general meeting, Hotel Statler, New York City, June 23-27.

NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas-Fort Worth Nomads, first Monday of each month, Greater Dallas Club.

Houston Nomads, second Monday of each month, Ye Ole College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month, Jonathan Club.

New York Nomads: December 8, Christmas dinner dance, Hotel Pierre.

IN A CLASS BY ITSELF...

COMPLETELY DRILLABLE
You will never have to "mill up" a Baker Retainer Production Packer.

NO "SET-DOWN" WEIGHT REQUIRED
When desired the tubing can be suspended in tension to avoid "corkscrewing."

RESISTS CORROSION
Cast iron construction of the packer is more corrosion resistant than steel casing.

HOLDS BOTH WAYS
Two full sets of opposing slips prevent downward or upward movement of packer.

CLEAR PASSAGE THRU PACKER
for "down-hole" work. Flapper type back-pressure valve opens readily and closes positively.

MANY APPLICATIONS
including two-zone, single-zone, testing, acidizing, repressuring, gas lift, etc., are possible with . . .

PACKER IS FREE FROM TUBING
and is practically part of casing. Vertical movement of tubing is unrestricted.

EFFICIENT ACCESSORY EQUIPMENT
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Product No. 415-D

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RETAINER PRODUCTION PACKER

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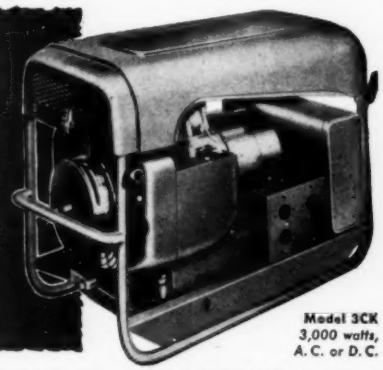
Oilfield

Electric Plants



Model 3CK
3,000 watts,
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Diesel, Gas, Gasoline-Powered

ONAN oilfield electric plants provide dependable light and power for any oilfield application. A complete range of A.C. and D.C. models, all conservatively rated for continuous, dependable service, helps you choose exactly the right plant for the job. Lightweight, air-cooled models from 400 to 5,000 watts; heavy-duty, water-cooled, gas-gasoline-driven plants from 3,000 to 35,000 watts. Air-cooled Diesel electric plants 2,500 and 5,000 watts. Water-cooled Diesels from 12,500 to 55,000 watts, powered by International Harvester engines.

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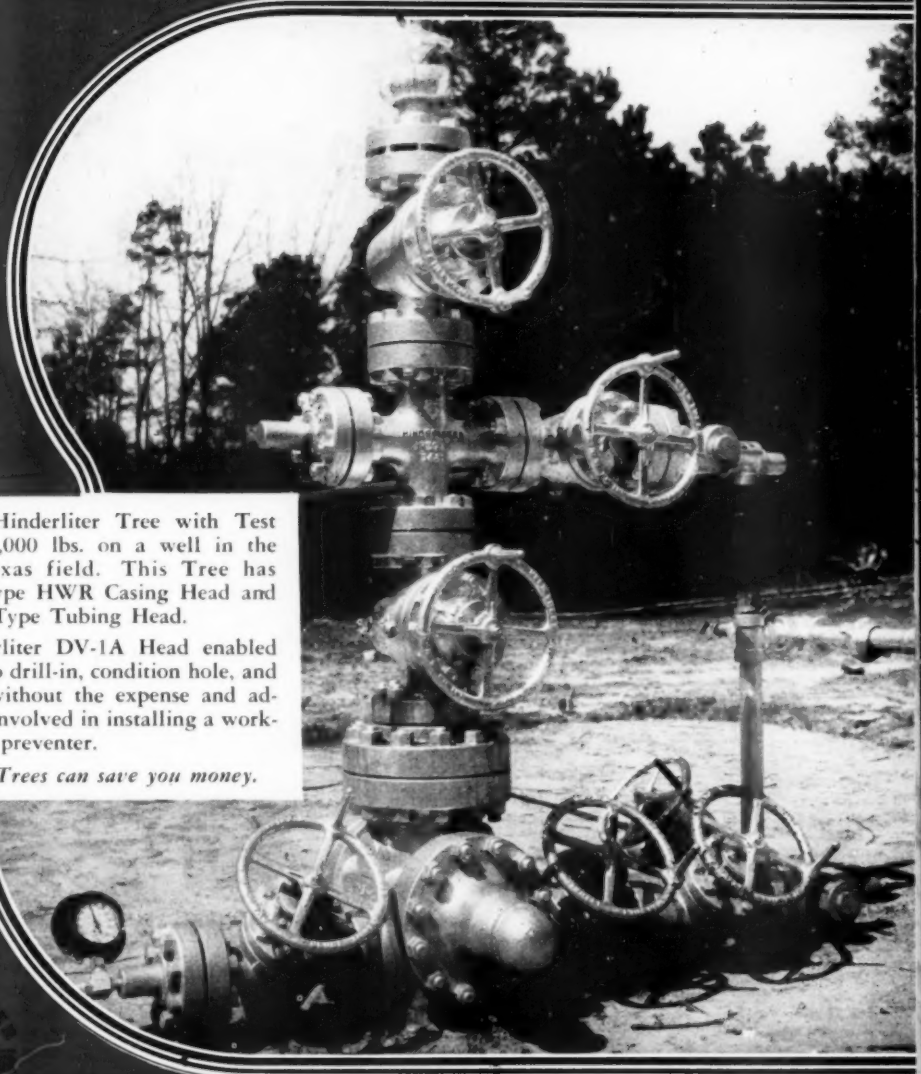

A typical Hinderliter Tree with Test Pressure of 6,000 lbs. on a well in the Carthage, Texas field. This Tree has Hinderliter Type HWR Casing Head and DV-1A Ram Type Tubing Head.

The Hinderliter DV-1A Head enabled the operator to drill-in, condition hole, and land tubing without the expense and additional time involved in installing a work-over blowout preventer.

Hinderliter Trees can save you money.

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Sold ONLY Through SUPPLY STORES

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JOURNALLY Speaking

Stable Currency

TO prove how vibrationless its drilling rigs are, Cardwell Manufacturing Co. recently ran an advertisement in our favorite oil publication picturing a nickel standing on edge on a bracket near the cathead.

This aroused the skepticism of J. R. Greeley, a Wichita drilling contractor, so he rushed out and tried it. "To my amazement," he wrote, "it actually worked while digging rat hole, where, in my opinion, there would be more vibration than any other time while the rig was in operation."

The remarkable thing about this is not the accuracy and veracity of the Big Yellow Book's advertising as well as its editorial content (this should never be doubted). Nor is it that a drilling contractor had a nickel (though some of them talk as though they never have). The amazing thing is that a nickel is good for something. A dollar sure won't stand up long these days.

Desert Doings

OUR peripatetic international editor, Dahl Duff, is now poking around the Middle East, and his reports indicate that that region is really a land of contrast.

His first reports to reach the home office told about the heat—"it seems to come right up out of the ground and hit you in the face like a physical force"—about how hard he was working, and about the rigors of existence amid sand and sun.

But later letters contained hints that things are not too tough all the time. He told about the modern towns and American living standards that Aramco has transplanted to the desert, and finally he let it slip out that the great American indoor sport of social congregation is not unknown in those parts.

"These people out here go in for social activity on a large scale," he wrote, "and apparently a visitor such as myself is a good occasion. There were various social affairs, dinners, and parties in my honor every evening I was in Saudi Araria and Bahrein."

Having discovered what American oil men use as an antidote for tedium and nostalgia, Dahl dropped down the coast a ways to find out how the British are faring on the isolated peninsula of Qatar, and reported:

"Duhkan here in Qatar is a comfortable little British colony. The British have a knack of living well in a place like this. They have a fine beach club, sailboats, and the usual air-conditioned quarters. Today being Friday, the Arab Sunday and a holiday out here, I went swimming in the Persian Gulf. The water was almost too warm, and very salty and buoyant."

Since reading that, we haven't wasted much sympathy on Dahl and his desert venture. We imagine he will come back chanting, like Omar Khayyam, "a jug of wine, a book of verse, and . . . wilderness is paradise enow."

". . . and Violets are Blue"

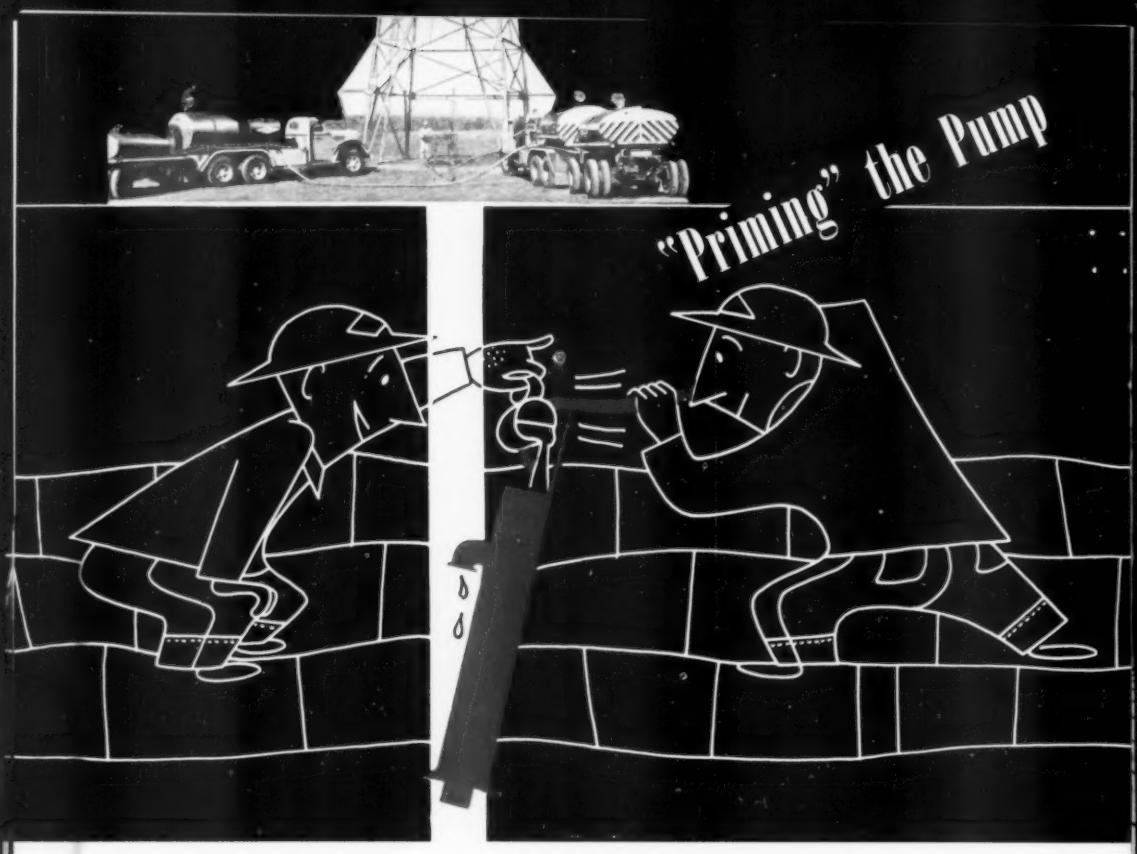
OUR circulation manager tries every known device to remind our readers that their subscriptions are about to expire and to induce them to renew promptly so as not to miss a single issue. One of his recent masterpieces of salesmanship started out: "Reach for your pen and check book." In spite of the bluntness of this command, it struck a poetic note with one of the recipients, who returned it with the notation:

"I reached for my pen, and check book too,
And wrote a check No. three eight two,
Then mailed the thing direct to you."

Cold Outlook

THE Office of Price Stabilization has been taking in a lot of territory in its attempts to freeze prices and has been notably cold toward industry's pleas for modernization, but it has now reached the ultimate. A recent order purports to freeze antifreeze.

Henry D. Ralph.



PRODUCTION POTENTIAL INCREASED because Dowell XM Acidizing Service reduced silicate swelling

Dowell Acidizing Service offers you the benefit of 19 years of extensive research and the experience gained in over 100,000 acidizing jobs! When you "Look to Dowell" you get the *right* acidizing treatment in your completion or work-over program.

For example, Dowell's experience has shown that some silicates, those of the clay mineral type found in certain dolomite and limestone producing formations, swell during conventional acid treatments. This silicate swelling not only delays the clean-up of the well after acidizing, thus increasing rigtime, but also can actually reduce oil production. Dowell research tackled the problem and solved it. Now, Dowell XM acid . . . which contains special chemical agents to control silicate swelling . . . is available to you for the profitable acidizing of formations known to contain such silicates.

A well completed in a Permian lime formation, known to contain swelling silicates, tested natural at 65 barrels of oil per day. Although acidizing treatments on comparable wells in the area had never given a potential over 100 barrels of oil per day, a 2000 gallon Dowell XM acid treatment produced a potential of 300 BOPD!

Today, Dowell is still pioneering new techniques and new materials to bring you advanced methods for completing and reworking oil and gas wells. When you need an expert acidizing job, call on Dowell to give you the best. There is a Dowell station near you.

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Ask your nearest Dowell station for complete information on these Dowell services and products: Acidizing Service, Electric Pilot Services, Plastic Service, Chemical Scale Removal Service for heat exchange equipment, Jelflake, Paraffin Solvents, Magnesium Anodes for Corrosion Control and Bulk Inhibited Hydrochloric Acid.

"First in Acidizing . . . since 1932"

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the OIL AND GAS JOURNAL

November 1, 1951

VOL. 50, NO. 26

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Confidence Amid Confusion

Self-confidence has always been one of the outstanding attributes of oil men, but the Government habitually has shown a singular lack of confidence in the oil industry. This divergence of view is particularly noticeable—and particularly serious—at the present time.

The United States is currently in a fog of confusion caused largely by its attempt to operate its economy partly controlled and partly free, a situation in which neither the Government, industry, nor the public knows exactly what the score is or ought to be. As a result the petroleum industry is looked to for maximum performance and service while a lot of obstacles are being erected which make its task more difficult.

Government officials give lip service to belief that oil can meet the nation's needs, but just to be on the safe side—or because they don't really believe what they say—they have imposed many regulations and threaten more. The already confused man in the street can hardly be blamed for concluding that the Government is convinced that the oil industry can't function properly without guidance from Washington.

Price controls, for example, were slapped on petroleum at the outset of the Korean crisis although there was no justification for this from the standpoint of supply and demand or the industry's historical record. They are being kept and made more complex in the face of evidence that in many segments of the industry freedom from controls would bring needed flexibility and higher output with no injury to consumers.

Synthetic fuel is another case in point. The industry insists that if and when they are needed and economically feasible it will produce synthetic fuels from coal, shale, tar sands, or something, and that it will provide all the necessary technology, financing, and initiative. Yet government officials keep agitating for federally owned or subsidized plants "to be prepared."

Examples could be multiplied to show that the Government doesn't trust the oil industry to supply the needs of its customers or to treat them fairly. Examples also are numerous to show that the industry's confidence in itself is well founded and that the current lack of faith is groundless.

To combat this situation the industry is engaged in a vigorous campaign to strengthen the public's faith and confidence in free enterprise. It does not argue that there should be no controls whatever during this period, but pleads that they be kept to a minimum, that industry be given the benefit of the doubt and be considered innocent until proved guilty.

This is the theme of scores of industry leaders before meetings of all kinds this fall and it will be a major topic at the American Petroleum Institute convention next week. This is most appropriate and timely, for if the public, during this period of national confusion, is permitted to lose its confidence in the oil industry, there soon will be no oil industry.

UNCERTAIN OUTLOOK.—The extent of military demands for petroleum products is one of the uncertain factors making it difficult to assess the industry's supply-and-demand position, as explained in this issue (see Economics). This picture shows drums of American gasoline being unloaded at Inchon, Korea, to supply United Nations troops.

THIS WEEK

PRODUCTION—Carbonated water does not increase oil recovery in flooding operations, Pennsylvania Grade laboratory tests show, but wetting agents show promise in field tests, secondary-recovery conference learns. . . . ¶Better uses of electric-log information in determining water saturation in calculating oil reserves, planning remedial operations, making stratigraphic or structural analysis discussed at A.I.M.E. meeting. . . .

SUPPLY AND DEMAND—Shortage of L.P.G. possible this winter if colder-than-normal weather occurs, transportation may be short. . . . ¶Refiners plagued with trying to keep supply, demand in balance; all watch for signs which may alter trends. . . . Stocks of most products high. . . .

WASHINGTON—Antimonopoly committee tells Chapman that government men should replace industry men as chairmen of NPC, other oil committees. . . . ¶NPA tells tubular-goods makers to step up output in order to increase drilling program. . . . ¶Operators unable to get shipments of controlled materials during quarter for which they were first scheduled will be given allotments in succeeding quarter, PAD says. . . . ¶NPC, Gas Advisory Council meeting this week to discuss major issues affecting industry. . . .

INDUSTRY—Opposition to Texas' new natural-gas tax law crystallizes as many pipe-line firms pay tax under protest. . . . ¶Letter by Secretary of Interior to governor of Mississippi recognizing state's ownership of lands under Mississippi Sound focuses new interest on tidelands ownership question. . . . ¶Barrier on oil and gas development in "potash area" of New Mexico lifted by Interior Department. . . . ¶Snyder gasoline plant now in full operation using deethanizing adsorber. . . . W. G. Skelly receives "Pennsylvanian Ambassador" award in Oil City, Pa. . . .

ACTIVITY—Crude production for week ended October 27 averaged 6,263,500 bbl. daily, down 5,915 bbl. from previous week. . . . ¶Total well completions increased 125 wells for the week to 979 compared with 946 for same week last year. . . . Wildcat completions totaled 230, up 50 from previous week and 48 from the same week in 1950. . . . ¶Rotary rigs operating in United States on October 22 reached 2,916 to set still another all-time record. . . .

TRENDS—Crude and major-product stocks increased 11,814,000 bbl. in the 4-week period ended October 20 compared with a gain of 14,951,000 bbl. for same weeks last year. . . . Crude gained 5,641,000 bbl. this year compared with 3,695,000 bbl. last year. . . . ¶Gasoline decreased 1,709,000 bbl. this year but increased 643,000 bbl. last year. . . . ¶Distillate increase was 6,384,000 bbl. in 4 weeks this year against 8,114,000 bbl. for same weeks in 1950. . . .

INTERNATIONAL—Remarkable story of planned development told in record of drilling in huge Ain Dar field by Aramco in Saudi Arabia during past 3½ years. . . . ¶United States attempting to bring British, Iranians together in effort to settle nationalization dispute, get stored products at Abadan on the market. . . . ¶Iraq lets contract to Kellogg for construction of 25,000-bbl. refinery near Baghdad. . . . ¶Burma may buy British oil interests. . . .

PIPE LINES—PAD pushing major crude, products, natural-gas lines through allocations of line pipe. . . . ¶Buckeye's products-pipe-line system approved by PAD. . . . Construction to start in spring on portion of 370-mile project. . . . ¶New Texas-Ohio Gas Co., Houston, asks FPC for authority to build 1,350-mile, 30-in. natural-gas line from Texas to West Virginia. . . . ¶Texas Pipe Line Co. reveals large construction program. . . .

REFINING—Gulf's Port Arthur refinery now among nation's biggest as new 63,000-bbl. catalytic cracking unit goes on full stream. . . . ¶Bay Petroleum get PAD approval for construction of 3,500-bbl. cat cracker at its Denver refinery. . . . ¶Foster Wheeler gets Gulf contract for construction of 125,000-bbl. atmospheric, vacuum distillation unit a Philadelphia refinery. . . .

NATURAL GAS—Long Beach, Calif., studying possibility of installing underground-storage project for conservation of casing-head gas. . . . ¶Michigan Gas Storage purchases lease rights for construction of underground storage project in old Riverside gas field of Missaukee County. . . .

Fizz Water Fizzles

Penn Grade lab tests show no increased oil recovery by carbonated water; wetting agents promising in field tests

Kenneth B. Barnes

STATE COLLEGE, Pa.—Carbon dioxide in water flooding doesn't obtain additional oil recovery.

That was the finding for certain specified laboratory tests reported at the fifteenth annual Conference on Secondary Recovery, held October 24-26 at Penn State College.

Earlier this year there has been much interest in the possibilities of "carbon dioxide" water flooding, since claims have been made that the final oil or residual saturation left after such operations could be lowered to as low as 8 per cent—compared to about 25 per cent for ordinary water flooding.

Although the laboratory tests presented were qualified as "only preliminary and further experimentation is required before any positive conclusions can be drawn regarding the effectiveness of carbon dioxide in water-flooding operations," in the open discussion following this report, representatives of two different major oil companies reported that their research laboratories also had found no substantial oil-recovery additions by use of carbon dioxide.

But gas injected prior to water flooding will increase recovery, another paper reported, detailing extensive laboratory tests and recovery experiments. And, as to getting more oil out of secondary-recovery projects, the Penn State oil-recovery audience was told that recent tests with wetting agents in Bradford field had obtained additional oil.

All told there were 13 papers presented on various aspects of secondary-recovery operations.

"Carbon dioxide" tests.—One well-known property of carbon dioxide is its excellent solubility in both crude oil and water, but the quantitative expansion of crude oil as CO_2 is dissolved in it, was investigated as the first part of the work, presented under the title "Laboratory Experiments With Carbon Dioxide and Carbonated Water as Flooding Mediums." The authors were J. Saxon, Jr., J. N. Breston, and R. M. Macfarlane, all with the production-research laboratory of the Pennsylvania Grade Crude Oil Association, Bradford.

On the crude-oil "swelling" phenomena, the laboratory experiments showed that Bradford crude oil when saturated with carbon dioxide at pressures up to 900 psig., increases in volume as much as 44 per cent. In the presence of brine the expansion in volume is slightly higher for any particular carbon dioxide-saturation pressure. When natural gas is dissolved in the crude oil a greater carbon dioxide-saturation pressure is required to effect the volume increase.

Oil-recovery tests.—Here, the preliminary experiments of the Penn Grade research laboratory on consolidated oil-sand cores showed no significant difference in residual-oil saturations, when flooded with both ordinary brine or carbonated brine. There was little or no additional oil recovery when a carbonated-brine flood followed the ordinary-brine flood, in spite of a 30 to 40 per cent expansion in volume of the oil in the cores.

Also, priming of one core with carbonated crude oil, after sufficient carbonated brine had been passed through to fully carbonate the core fluids, brought about only a slight reduction in residual-oil saturation upon further flooding with carbonated brine.

In "flood" tests using straight liquid carbon dioxide, this medium when passed through the cores caused an appreciable reduction in oil saturation by a solvent-extraction mechanism.

Little change shown.—Analysis of the crude oil produced from the cores by liquid carbon dioxide showed little change in physical properties. The analysis of the produced gases indicated an absence of unsaturates.

Table 1 lists the fluid saturations at the end of each oil recovery test operation for a Venango Core (Pa.) and also shows the inlet and outlet pressures. The core after the first oil saturation with 150 psig. bubble point crude was "naturally" produced until the pressure in the core was 20 psig. The oil saturation after that operation was 51.1 per cent.

The core was then brine flooded at low static pressure until the oil saturation was 39.8 per cent. The static pressure on the core was then raised to 760 psig. and a second brine flood carried out at that high static pressure. That flood reduced the oil saturation only a trifle down to 39.7 per cent.

Immediately thereafter a brine which was 100 per cent saturated with carbon dioxide at 750 psig. was flooded through the core. After eight pore volumes of brine had passed through the core the oil saturation stood at 39.4 per cent, a reduction of only 0.3 per cent due to flooding with carbonated water.

Oil expanded.—Material balance on injected and produced carbon dioxide showed that enough carbon dioxide stayed in the core to theoretically expand the oil volume 36 per cent. Therefore, because of this volume change due to solution of CO_2, the laboratory analyzed the data on a basis of actual oil volume, i.e., when expanded by carbon dioxide. (See columns titled "CO_2 Expanded Oil." These figures represent the actual saturations when carbon dioxide was being used.)

If the first carbonated brine flood is considered as an example, it is noted from Table 1 that the oil saturation after the first carbonated-brine flood measured at atmospheric pressure is 39.4 per cent. This value corrected for expansion caused by carbon dioxide is 53.6 per cent of the pore volume.

This oil saturation of 53.6 per cent is even higher than the oil saturation after the first natural-production operation. In spite of this the carbonated brine flood was not able to reduce the oil saturation.

Similar flooding experiments were made on a Rushford (Bradford, Pa.) core, and the results are as summarized in Table 2.

Wetting-agents tests.—It has been known for years that under laboratory conditions it was possible to increase water-flood oil recovery by using wetting agents in the flood water. However, their applicability to the oil fields has been doubted by numerous investigators because it was feared that the wetting agent would be lost by adsorption in the oil sand, and the process perhaps would be uneconomical. Recent experiments made through the Bradford laboratory of the Penn Grade Crude Oil Association show that wetting agents can be made to work in the oil fields and produce additional oil at a profit. The paper, by Dr. J. N. Breston, director of the laboratory, and Willard Johnson, research assistant, described four experiments with wetting agents performed in the Bradford oil fields.

In all four tests the wetting agent was introduced directly into the flood water injected into the water-input wells. Three of the four tests showed definite increases in oil production which can be attributed to the wetting agent. The fourth test has not been operating long enough to draw any conclusions.

Profitable.—In two of three tests which were completed, the value of the additional oil produced was twice the cost of the wetting agent used.

Skelly Receives "Pennsylvanian Ambassador" Award

William G. Skelly, left, president of Skelly Oil Co., Tulsa, receives the "Pennsylvanian Ambassador" award from Dr. Paul Giddins, right, curator of the Drake Well park and museum, who was the principal speaker at a testimonial dinner held in Oil City, Pa. Chester L. Suhr, Oil City, chairman of the board of Pennzoil Co. and toastmaster of the occasion, is shown in the center. Fred F. Murray, president, Oil Well Supply Co., Dallas, occupied a prominent place on the program. The guest of honor began his oil-industry career with Oilwell. The Oil City Chamber of Commerce nominated Skelly, a former resident, for the award and sponsored the meeting attended by several hundred oil-industry and civic leaders from Oil City and western Pennsylvania. The ambassador award is conferred by the state upon former distinguished sons of Pennsylvania in connection with the annual celebration of Pennsylvania Week. It consists of an aluminum plaque and a hand-lettered scroll bearing the signature of the governor, the state secretary of commerce, presidents of the Pennsylvania Chamber of Commerce, and Oil City chamber.

The research group feel that wetting agents under certain conditions may be used profitably to increase oil recovery, at least as far as the Bradford sand is concerned. Also, they intimated, since laboratory experiments indicate that wetting agents can recover oil from sands of other pools there is reason to believe that wetting agents will work in other oil fields just as well, or even better.

The wetting agents did not noticeably change the injection behavior of the water wells and only insignificantly small amounts of wetting agent were found in the oil wells up to 6 months after injection. No emulsion trouble was encountered and there was no change in the physical properties of the produced crude oil. Further tests are in preparation for the Bradford (Pa.) and Wellsville (N. Y.) oil fields.

Observations noted.—Also on waterflood wetting agents, in a paper titled "Review of Laboratory Experiments on Wetting Agents for Water Flooding," J. C. Calhoun, Jr., C. D. Stahl, F. W. Preston, and R. F. Nielson made the following observations principally from reviewing Penn State College oil recovery experimental work performed during the years 1933-51:

1. Wetting agents will reduce residual oil, at times to values below 10 per cent.

2. Not all wetting agents can be expected to lower oil residual.

3. It is not clear how much of the wetting-agent action is due to wetting changes and how much due to interfacial-tension lowering. It does appear that the latter is always desirable, but its importance apparently differs between water-wet and oil-wet systems. In oil-wet systems, to which a good portion of the reviewed data apply, the lowering of residual oil correlates fairly well with lowered interfacial tension.

4. The importance of adsorption is paramount to successful economic use of wetting agents but it is not necessary to consider complete coverage of sand by an adsorbed agent. A principal economic feature is apparently the large volumes of water required to carry on the operation rather than the large amounts of agent to be adsorbed.

5. Adsorption data available on the wetting agents tested indicate that the movement of a flood front would be from about 2 to over 100 times as fast as the advance of the adsorbed wetting agent.

6. Other chemical additives in place of wetting agents may produce the desired lowered interfacial tension with much less adsorption.

Gas ahead of flood.—One of the important developments in the technique of secondary-oil recovery by water flooding in the past 10 years has been the injection of a limited amount of gas just prior to flooding with water. Increased oil recovery and other benefits are obtained by such an operation which is tending to become somewhat of a standard practice in the Bradford-Allegheny oil fields.

In the paper "Effect on Recovery of the Solubility of a Gas Injected Prior to Water Flooding," R. M. Macfarlane and Joseph Saxon, Jr., of the Penn Grade laboratory described some recent experiments which show that the maximum benefit of additional oil recovery by gas injection ahead of water flooding can be obtained if the gas does not dissolve in the oil. They showed that when more free gas stayed in the oil sand the less would be the residual oil, and the greater would be the recovered oil. In effect, the free gas is substituted for the residual oil which normally stays in the oil sand after flooding is completed.

TABLE 1—SUMMARY OF OIL RECOVERY DATA, VENANGO (PA.) CORE

(Paper by Saxon, Breston, Macfarlane)

Operation	Outlet press. (psig.)	Pressure differ. (psig.)	Core saturations at end of operation, per cent of pore volume: Normal Oil	Normal Brine	Normal Gas	CO_2 expanded oil	Pore volumes of produced fluid
First brine saturation	Vac.	64	0.0	89.4	10.6		1.1
Depressuring	0		0.0	86.2	13.8		
First oil saturation	150	50	59.7	26.5	13.8		6.0
First natural production	20		51.1	23.8	25.1		
First brine flood	15	51	39.8	53.2	7.0		0.6
Second brine flood	766	42	39.7	59.8	0.5		0.8
First carbonated brine flood	760	41	*39.4			53.6	8.1
First CO_2 gas drive	760	42	*30.9			43.3	45.0
Second carbonated brine flood	760	42	*29.9			41.0	1.6
First liquid CO_2 flood	860	46	*23.2			32.5	1.2
Second CO_2 gas drive	760	56	*23.2			32.5	45.0
Third carbonated brine flood	760	43	*23.2			32.5	2.4
Second oil saturation	760	45	41.4				2.1
Third brine flood	760	46	35.6				1.0
Third oil saturation	765	38	44.7				1.9
Fourth carbonated brine flood	762	43	*36.1			47.5	9.8
Carbonated brine after priming with one-fifth pore volume of crude	762	61	*34.0			46.0	1.1
Depressuring			24.4				

*Oil saturations not corrected for expansion by CO_2

TABLE 2—SUMMARY OF OIL RECOVERY DATA, RUSHFORD (BRADFORD, PA.) CORE
(Paper by Saxon, Breston, Macfarlane)

Operation—	Outlet press. (psig.)	Pressure differ. (psig.)	Core saturations at end of operation, per cent of pore volume: Normal Oil	Normal Brine	Normal Gas	CO_2 expanded oil	Pore volumes of produced fluid
First oil saturation	150	50	88.4	0.0	11.6		1.1
First brine flood	125	25	36.9	48.6	14.5		0.4
Second oil saturation	150	25	66.8	23.6	9.6		0.4
Natural production	20		42.7	23.1	34.2		
Second brine flood	20	30	37.9	54.4	7.7		2.2
Third brine flood	760	6	37.9	62.1	0.0		1.4
First carbonated brine	760	6	*37.9			49.4	5.7
First CO_2 gas drive	760	10	*37.6			52.6	56.0
Second carbonated brine	760	40	*37.3			52.2	1.0
Liquid CO_2	890	49	*28.8			40.3	1.5
Depressuring			28.1				

*Oil saturations not corrected for expansion by CO_2.

The tests showed that nitrogen was superior to such gases as natural gas, propane, and carbon dioxide because it was practically insoluble in the oil under the conditions of the tests, while the other gases all had considerable solubility. Further tests showed that engine-exhaust gas, which is four-fifths nitrogen and which is plentiful in the oil fields, would be a cheap source of nitrogen for gas injection ahead of flooding.

(A complete digest section covering in further detail all papers presented at the fifteenth annual Conference on Secondary Oil Recovery held at Penn State College, will appear in an early issue.)

WEST COAST

Utilizing Log Data

Better uses of electric-log information in determining water saturation of formations discussed by A.I.M.E.

D. H. Stormont

LOS ANGELES.—A discussion of how field petroleum engineers and geologists can better utilize the information recorded on electric logs to determine the water saturation of formations in calculating oil reserves, in planning remedial operations, or in making a stratigraphic or structural analysis, was one of the highlights of the Pacific petroleum branch annual meeting of American Institute of Mining and Metallurgical Engineers held here last week.

Speaking on the "Quantitative Aspects of Electric Log Interpretation," J. E. Walstrom of Standard Oil Co. of California, San Francisco, first reviewed the necessary elements and basic steps. He then pointed out the degree of reliability of quantitative determinations under different conditions. The term "quantitative intepretation" he restricted to mean the determination of water saturation of a formation.

Many assumptions. — Regarding the possibility of determining water saturation using only the potential and resistivity curves, Walstrom said the calculations were subject to so many assumptions that at best only a qualitative evaluation could be made. This, however, may be of great value from the practical standpoint he stated, adding:

"If it could be determined that a particular 100-ft. thick sand, as revealed on the log of an exploratory well, had a water saturation of between 20 and 50 per cent, it would ordinarily be considered entirely economic to set casing if this were necessary to test the sand adequately."

In summarizing the present status of the art of interpreting electric logs, from the viewpoint of evaluating the fluid content of a formation, Walstrom said:

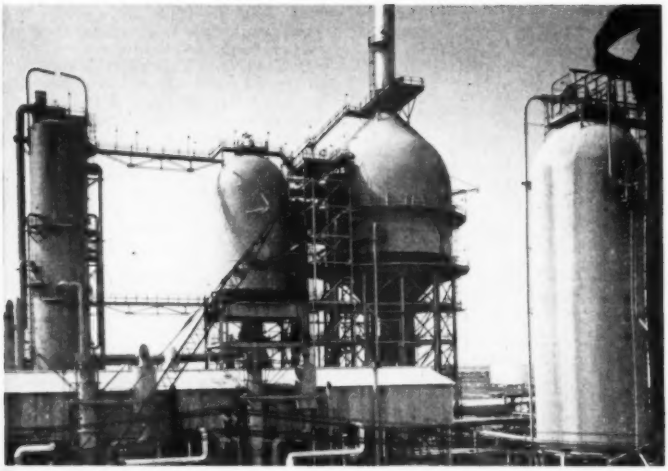
"In development drilling, a quantitative determination of the water saturation of sands and sandstones may be made from the electric log. This requires, however, that the formation factor and the formation water resistivity are known. A knowledge of the clay content and its effect on the electrical behavior of the sand is also necessary. The determination of water saturation becomes unreliable in thinly interbedded sand-shale sections. Coring of the productive sand in selected wells is desirable in order to determine formation factor and clay characteristics.

Caution needed. — "In exploratory drilling the electric log assists in singling out those formations that show evidence of containing oil or gas. These formations can then be evaluated by the more diagnostic formation-testing methods. When examining exploratory well logs, great caution should be exercised in order not to miss any possibly productive horizons of a fractured nature. Under exploratory drilling conditions, the electric-log interpretation often becomes quite qualitative in nature, but is still of considerable value in the over-all formation-evaluation program.

"It appears that further research in the field of petrophysics and further development of electric logging systems will increase the accuracy of the quantitative methods. It is probable that improved logging methods will make possible a more accurate determination of formation factor from invaded zone measurements. Further research may provide a more precise method of determining formation interstitial water resistivity from the potential curve. It is important that results of research be adequately and thoroughly tested in the field before placing too much confidence in them."

Viscosity vs. oil recovery.—Their laboratory studies on the effect of viscosity in water flooding were reported on by Martin Felsenthal of Continental Oil Co., Ponca City, Okla.; and S. T. Yuster of University of California at Los Angeles. In their work a comparison was made between

A.I.M.E. LEADERS.—Shown at the meeting of the Pacific petroleum branch, American Institute of Mining and Metallurgical Engineers in Los Angeles, are, left to right: Ed R. Robie, national secretary, New York; M. L. Haider, Imperial Oil Co., Ltd., Toronto, next year's national president; R. W. French, Sohio Petroleum Co., Cleveland, current chairman of the petroleum branch; and Basil Kantzer, Los Angeles, chairman, Pacific petroleum branch.



Gulf's Giant Cracker

This 63,000-bbl. fluid cracker, just placed on stream at the Port Arthur refinery of Gulf Oil Corp., is the largest of its type now in operation and will handle 47,000 bbl. of fresh feed and 16,000 bbl. of recycle stock daily. The unit will increase production of motor gasoline by 20,000 bbl. per day with the same crude charge to the refinery, and this refinery is now one of the largest in the country with a capacity of 275,000 bbl. of crude per day.

actual and theoretical recoveries. They found that oil saturations at water breakthrough and during subordinate phase production agreed approximately, in certain ranges, with the saturations predicted from the theory of Buckley and Leverett.

A core of consolidated Venango sand encased in Lucite was used in the experiments, in which the effect of varying the oil-water viscosity ratio from 0.034 to 95 on results of water floods was studied. From these studies they found:

1. Oil saturations at water breakthrough decreased with decreasing oil-water viscosity ratios until a ratio of one was reached; the decrease became negligible when the ratio became less than one.

2. There was a critical oil-water viscosity ratio of about seven, below which floods were characterized by absence of a subordinate phase of oil production.

3. For floods at oil-water ratios higher than the critical ratio of about seven, it appeared that the residual-oil saturation attainable at a very high water-oil ratio (800 or more) became independent of the oil-water viscosity ratio.

The authors emphasized that the magnitude of the results obtained in these tests reflected to some measure the properties of the core used. However, it was believed that the trends shown would be applicable generally.

Trends in drilling.—In spite of their great dependence upon the contract-drilling industry, A. H. Bell of Bell & Burden, Inc., Los Angeles drilling contractors, said that most of the oil companies have tacitly allowed a system of intense price competition to develop among the contractors. At the same time, he added, a gradual decline has taken place wherein the contractors have been required by their clients to furnish additional equipment and services, and to assume greater risks.

Simultaneously, in their anxiety to continue operating and without full knowledge of the increased costs of the additional services and risks required, the contractors have continued to bid lower for the work.

Weakens position.—"This destructive price competition," Bell said, "has weakened the financial position of the contractors to the extent that they have been reluctant to assume the expense of carrying young engineers on their overhead payrolls for intangible long-range benefits.

"Also the average contractor of today cannot see his way clear to replace an old rig with a new, modern, and efficient rig at current footage rates. This is particularly true because the price of a new rig today is about double that of a comparable rig in 1945.

"The gradual decline of contract drilling as an efficient and well-equipped branch of the oil industry would bring eventual losses to the oil companies, a fact they might do well to consider and take some steps to correct. The oil companies who employ the drilling contractors can remedy this situation if they have sufficient interest in the long-range improvement of drilling methods."

California Production Up

LOS ANGELES.—Because of the high rate of drilling being carried on in California fields, the state's daily crude-oil production continues to climb toward the 1,000,000-bbl. mark. Current production is about 987,000 bbl. daily, an all-time high, but even this output is just barely sufficient to meet demand.

Due largely to the production of new oil wells, which have been completed at the rate of 150 monthly, daily oil production has increased about 20,000 bbl. in the past 5 months.

Despite the slowly rising production, stocks of all oils have continued to decrease. For the first 8 months of the year they declined a total of 7,204,000 bbl. During September they continued to decline at the estimated rate of 2,000 bbl. daily, or to a level of about 88,935,000 bbl. Currently supplies are believed to be exceeding demand by a few thousand barrels daily.

If operators can obtain the necessary casing and tubing to carry out the programs they have scheduled for the remainder of the year, the upward trend in production should continue.

NORTHWEST

Washington May Have Gasser

ABERDEEN, Wash.—It appears possible that Washington may have its first commercial producer in a gas-distillate well drilled at Ocean City in Grays Harbor County, though conclusive tests have not been run.

Hawksworth et al 4 State, SW 15-18n-12w (Willamette Meridian) was tested for 8½ hours at rates of 500,000 to 2,000,000 cu. ft. of gas per day.

Operators estimate that when the well is equipped to extract liquid products from the gas it will produce approximately 100 bbl. daily. Pressures up to 2,700 psi. were recorded. The well was drilled with rotary tools.

The test, 550 ft. southwest of Union Oil Co. 3 State, was drilled to a depth of 3,711 ft., 126 ft. into the Miocene-Kincaid, a fractured shale and sand, and is believed to be producing from three sands in the Kincaid.

Union 3 State, total depth 9,344 ft., was completed dry about 1 year ago after spending several months trying to develop noncommercial shows of oil found in the Miocene sediments.

The 4 State is located in the middle of a 20,000-acre block held jointly by Hawksworth et al and Los Nietos Co., a wholly owned subsidiary of Union Oil Co. of California. The well site is below mean high-tide line.

L.P.G. Shortage Looms

Inadequate supply of product, transportation seen if colder-than-normal weather occurs; demand up sharply

John C. Casper

USERS of liquefied petroleum gas face a possible shortage during the winter months. Consumption of L.P.G. has increased at such a rate that colder-than-normal weather could result in an actual shortage in product as well as a shortage in transportation.

Demand for L.P.G. in the first 8 months of this year was 25 per cent greater than in the same months of 1950. This demand classification includes only sales for fuel and chemical uses plus exports. It does not include shipments of normal butane and isobutane for gasoline blending at refineries.

If the same rate of increase continues through the winter months, the potential demand next January and February would reach about 390,000 bbl. daily. The monthly projections for the period from September 1951 through March 1952, shown on the accompanying chart, assume a gain of 25 per cent each month over the same month of the previous year.

Since primary stocks of L.P.G. are very small compared with monthly sales, almost all of the winter demand must be met by current production.

Demand for L.P.G. in the first 7 months of this year amounted to 59,351,000 bbl. or only 16 per cent less than total demand for kerosine. L.P.G. stocks at the end of July, including inventories of liquefied refinery gases but excluding butanes at refineries for blending, were only 2,169,000 bbl. compared with 27,277,000 bbl. of kerosine in storage.

Peak in July.—Stocks of L.P.G. at plants and terminals plus L.R.G. at refineries reached a 1950 peak at the end of July and dropped to the low point by the end of February 1951. However, this summer-to-winter draft on stocks amounted to only 661,000 bbl. or about enough to supply 2 days' demand.

Suppliers were pushing two methods of increasing over-all storage capacity so that stocks can be built up during the summer to help meet high demands in the winter months.

Many suppliers and marketers have programs for additions to primary storage capacity. These plans include both aboveground steel tanks as well as cavity-type underground storage. Several of the underground projects have been completed, but in some cases this storage was not available in time to fill it during the summer months.

Larger tanks.—Soon after the end of the last war, many L.P.G. suppliers started urging jobbers and dealers to start selling larger tanks to new customers and promoting storage additions and conversions at old accounts. If the average consumer's tank were large enough to hold half the fuel he needs during the winter months, the seasonal problems of both supplier and distributor would be solved.

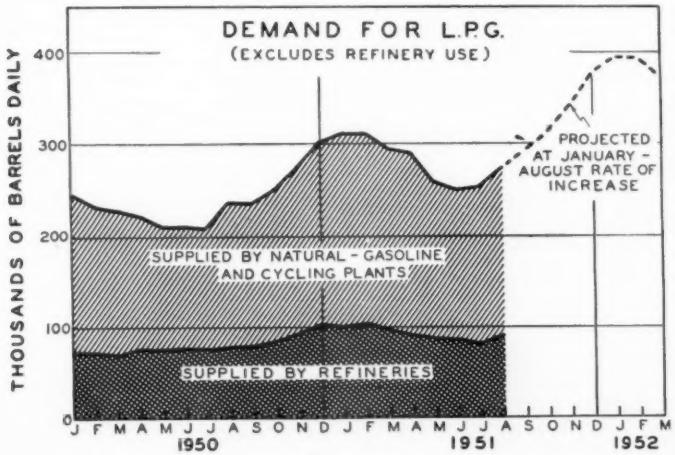
Since suppliers have trouble meeting all of the winter needs out of plant and refinery production during the winter months, most jobber contracts contain clauses limiting winter purchases to about 1.5 times the volume taken during the summer months. If consumers can be sold on the idea of larger storage with summer fillup, the average cost of L.P.G. to the customer will be reduced.

Prospects hampered.—Prospects for large increases in production are being hampered by relatively low price ceilings. Most suppliers in the Mid-Continent and southern areas have a ceiling of 4 cents a gallon for propane. If the product is handled by a marketer, the cost will be about .25 cent a gallon plus .5 cent for cars. The raw-gas cost will average about 25 per cent of price of the liquid, or 1 cent. The remaining gross of 2.25 cents is applicable only to that part of the production which can be sold at 4 cents. Part of the summer output may move at "give-away" prices. In some cases excess summer production may be moved in crude lines to refineries and burned as boiler fuel.

It has been estimated that some cycle plant operators can produce propane for 3.25 cents a gallon. This estimate is based on an arbitrary allocation of costs among products. At this price, a plant may lose money on propane since, in many cases, as much as 30 per cent may have to be pumped back into the ground because of lack of demand in the summer months.

Minimum ceiling.—Some suppliers report that a minimum ceiling of 5.5 or 6 cents a gallon is needed to cover increases in construction and operating costs. Product still would sell well below ceiling during the summer months.

Aside from the need for higher price ceilings on winter sales, the big requisite for more stable operation is more storage, both primary and consumer.


DEMAND FOR L.P.G.
(EXCLUDES REFINERY USE)
THOUSANDS OF BARRELS DAILY
400
300
200
100
0
PROJECTED AT JANUARY - AUGUST RATE OF INCREASE
SUPPLIED BY NATURAL-GASOLINE AND CYCLING PLANTS
SUPPLIED BY REFINERIES
J F M A M J J A S O N D J F M A M J J A S O N D J F M
1950
1951
1952

PAD Starts Exports Service

Exports of major petroleum products averaged 356,000 bbl. daily for the week ended September 28, according to data released by the Petroleum Administration for Defense. The new statistical service, an-

EXPORTS OF MAJOR PRODUCTS

(Thousands of barrels daily)

	Week ended Sept. 21	Week ended Sept. 28	4 weeks ended Sept. 28
Aviation gasoline	58.1	32.7	33.5
Motor gasoline	116.7	79.9	72.0
Kerosine	52.1	59.0	38.9
Distillate fuel	63.2	84.8	78.3
Residual fuel	117.9	100.2	101.2
Total	408.0	356.6	323.9

nounced by PAD, will supply export data on a weekly basis, compiled from export declarations filed by shippers. The time lag will be about 3 weeks.

Daily average for the week ended September 7, the first week for which the information was compiled, was 286,300 bbl. The total decreased to 244,600 bbl. daily for the week ended September 14.

Lower export rates in the first 2 weeks of the month held the 4-week average to 323,000 bbl. daily. This compares with an average of 364,000 bbl. daily for the month of August, as reported on a monthly basis by the Department of Commerce and excluding shipments to territories. *(The Oil and Gas Journal, October 25, 1951, page 81).*

Refiners' Quandary

They are plagued with trying to keep supply and demand in balance; all watch for signs which may alter trends

John C. Casper

THIS is the time of year when refiners watch stock figures like a hawk for clues as to the trend of demand, and as the heating season opens this year they are confronted with such questions as:

Are gasoline stocks too high? Can refiners find storage space for increased distillate inventories during the next few weeks? When will the winter demand for residual fuel start? Will demands for the Korean war increase? What would be the effect if the Iranian shutdown were ended?

Product inventories are the barometers that record the combined effect of shifts in both supply and demand. Abnormal stock changes are storm warnings for refiners, and November 1 is a critical point when total stocks are normally near the peak for the year and are now at record levels.

Stocks gain.—Major product stocks totaled 295,582,000 bbl. on October 20, a gain of 34,557,000 bbl. or 13.2 per cent over the same date in 1950. Recent forecasts of total demand by the Bureau of Mines and by the economics committee of the Independent Petroleum Association of America show estimates for the 6-months period ending March 31, 1952, of about 8,025,000 bbl. daily or a gain of about 6.6 per cent over the winter months a year ago. Thus, the percentage gain in demand is about half the percentage increase in inventories.

However, this ratio of increases by itself does not prove that inventories are too high. Supply sources have changed since last winter. For the six winter months last year, imports of products averaged 430,000 bbl. daily. All current estimates indicate that supply from this source will not increase proportionately with demand but will be less than it was last year.

Refinery runs.—Refinery runs averaged 6,295,000 bbl. daily last winter and would have to average 6,710,000 bbl. daily this winter to reach the same percentage increase forecast for demand. Weekly reports indicate that the October average may be at least 200,000 bbl. daily under the 6,710,000 bbl., and lack of storage space for products may prevent any major increase in November.

If refiners are unable to run enough crude in the last 4 months of winter to produce an increase in runs equal to the percentage increase in demand, the difference will show up as a further draft on product stocks.

These variations in supply factors and the uncertainties in wartime demand indicate that the over-all increase in major product stocks may not be too high. However, the distribution of increases by districts and products can present some problems in the coming weeks. If the gains for the four products in the accompanying table are combined, it will be noted that District 2 accounts for over 19,000,000 bbl. or 55 per cent of the total increase. Stock gains in Districts 1 and 2 combined represent 86 per cent of the total. Major product inventories on the West Coast are about 4 per cent less than they were last year.

Increases in stocks of distillate fuels make up more than 50 per cent of the total gain in major-product inventories. Even here the distribution by districts is an important factor. District 5 has 3,000,000 bbl. less distillate than last year. The gain for District 3 was only 1,443,000 bbl., and District 4 was down slightly. Districts 2 and 1 have had increases of 43.8 per cent and 36.2 per cent respectively.

Gasoline inventories on October 20 were only 5,981,000 bbl. greater than last year compared with a difference of 10,000,000 bbl. on September 15. District 1 stocks are less than they were a year ago.

Only District 2 has had a gain in residual inventories of more than a million barrels.

Watching for changes.—For the next few weeks, refiners will be watching for changes that will indicate trends for the coming winter.

Primary gasoline markets have been relatively firm all summer, but scattered price wars at the service-station level have shown that individual suppliers were unwilling to accept losses in marketed gallonage. Any marked increase in the number of these price wars would reveal some softness in the general gasoline market.

Kerosine demand in the past 4 weeks has been greater than refinery production, but the gain was to be expected. Jobber and consumer purchases of kerosine for storage do not come until September or October. Early winter-demand trends will be indicated by refill sales during the next 6 weeks.

Summer buildup.—The summer buildup of distillate stocks for the combined Gulf-East Coast area starts on the East Coast near points of consumption. Gulf Coast or District 3 inventories do not increase materially until primary storage on the East Coast has been filled. Refiners often can get a fair picture of East Coast sales to resellers and consumers in November by watching District 3 stocks. On September 20, District 3 stocks were only 167,000 bbl. greater than on the same date in 1950. Stocks are now up 1,443,00 bbl. from a year ago.

Distillate inventories up.—In like manner, the stock buildup in the north-central portion of District 2 is greater than in the Mid-Continent. Distillate inventories in the high demand areas of the Illinois-Indiana-Kentucky refining district are 7,200,000 bbl. greater than at this time last year compared with a gain of less than 3,000,000 bbl. for the Mid-Continent.

Most heating-distillate sales by Oklahoma-Kansas refiners will be limited by movement to consumers in the north-central states.

Military and shipping demands for residual fuel have resulted in firm markets for this product in all coastal areas. Loss of production at Abadan added to the demand on refiners in this country and cut our import supply. However, movement out of primary storage in recent weeks has been lower than a year ago.

The effect of the winter shift back to residual from natural gas by many industrial plants should show up as demand changes in November. Settlement of the Iranian problem would have a decided effect by increasing residual supply. Changes in stocks of residual during November will be watched closely for these trends.

MAJOR PRODUCT STOCK CHANGES OCT. 21, 1950, TO OCT 20, 1951
(Thousands of barrels)

District*	Gaso.	Kero.	Dist.	Resid.
1	— 710	+ 873	+ 9,702	+ 822
2	+ 4,043	+ 2,391	+ 10,215	+ 2,476
3	+ 1,921	+ 1,566	+ 1,443	+ 940
4	+ 364	+ 4	— 4	+ 269
5	+ 363	— 20	— 3,001	+ 900
Total U.S.	+ 5,981	+ 4,814	+ 18,355	+ 5,407

*District 1, East Coast plus West Virginia; District 2, North Central plus Mid-Continent; District 3, Gulf Coast plus New Mexico; District 4, Rocky Mountain; District 5, West Coast.

Change in Chairmen Urged

Antimonopoly committee suggests that government men replace industry men as heads of NPC, other oil groups

WASHINGTON.—Substitution of government officials for industry men as chairmen of the National Petroleum Council and the committee and subcommittees set up under the voluntary agreement for the supply of oil for foreign countries affected by the Iran shutdown was recommended to Interior Secretary Oscar L. Chapman this week by the House antimonopoly subcommittee.

At the same time, the subcommittee, headed by Rep. Emanuel Celler of New York, called for the close supervision by the Department of Justice of any schedules or programs set up by the foreign petroleum-supply committee and urged a tightening up of the conditions surrounding the employment of industrial executives in the defense agencies without compensation.

A lengthy report in which these recommendations were incorporated made no charges that the National Petroleum Council has not operated in strict conformity with law and in the best interests of the defense program, and the suggestion was based on the contention that "there is no reason why the NPC or its subcommittees should operate under procedures which differ materially from those established after mature consideration and deliberation for other advisory bodies to the Government."

The NPC is the only advisory body operating under an industry chairman, but the subcommittee ignored the fact that the pre-Korean character of the council was continued only after the Department of Justice had given its approval and is in line with the makeup of the Petroleum Industry War Council to which it is the successor.

Government chairman "essential."—The subcommittee, however, held that a government chairman "is one of the essential criteria for the effective functioning and utilization of industry-advisory committees" and asserted that "the petroleum industry, especially in view of its importance to both the mobilization and civilian economy, should abide by this basic requirement."

The subcommittee also was critical of the procedure for application of the voluntary agreement designed to offset the effects of the Abadan shutdown and plan of action No. 1 under that agreement.

All committees, subcommittees, or other groups set up under the plan should have government chairmen, and "inasmuch as the agreement contemplates the development of plans encompassing the joint utilization of storage facilities; the alteration of refinery yields; exchanges, loans, sales, and purchases of petroleum products, etc.; among industry members, it is most important that government officials preside at all meetings," the report said.

Amendment asked.—It was further recommended that section 5 (b) of the agreement should be amended to insure that the agenda of the foreign petroleum-supply committee and of any subcommittee shall be formulated by government officials, the report explaining that "the subcommittee feels that the activities of the committee should be carefully confined to the express activities for which exemption from prosecution under antitrust statutes has been granted."

In line with this general policy, the subcommittee recommended that a government official preside at all meetings of the subcommittee established under plan of action No. 1 since "the functions of this subcommittee is drawing up implementing schedules in accordance with the plan of action making it imperative that government officials be aware, from their very inception, of all contemplated schedules."

Close scrutiny needed.—"Similarly," the report continued, "with regard to plan of action No. 1, the subcommittee recommends that each of the implementing schedules which are to be adopted by the subcommittee and approved by the foreign petroleum-supply committee be separately approved or disapproved by the attorney general pursuant to section 708 of the Defense Production Act. The plan of action, which has been exempted from the provisions of the antitrust laws, provides in general terms for the operations of the subcommittee and the foreign-supply committee insofar as international production, pooling, distribution, storage and transportation of petroleum and petroleum products are concerned. The substantive content of the plan, however, remains to be formulated by means of implementing schedules. By the very nature of such schedules, therefore, dealing as they do with what have long been legally considered cartel practices, it is imperative that each of them be closely scrutinized by the Department of Justice."

The subcommittee's investigation of the men serving the Government without compensation (WOC's) brought nothing but commendation for the manner in which, without exception, they have conducted themselves but held that some changes should be made in their selection not only in the interest of better spreading industry's contribution to the defense effort but to protect the men themselves against possible unfair criticism.

Greater effort needed.—To these ends, it recommended that "in order to get the benefit of a better synthesis of business philosophy" greater effort should be made to obtain WOC's from corporations not among the very largest in the economy. The subcommittee admitted that financially it is more difficult for a small company to send a man to Washington, but contended that in the appointment of WOC's primary consideration should be given to individual merit and not to company affiliation.

It was also recommended that fewer sales executives should be employed on a without-compensation basis and their duties should not require them to make decisions directly affecting former customers, while attorneys and paid trade-association executives should be hired as WOC's only in exceptional circumstances.

NPC, Gas Council to Meet

WASHINGTON.—The National Petroleum Council and the PAD Gas Advisory Council are meeting this week for what are expected to be their final 1951 sessions.

Both groups have important matters to discuss and will be brought up to date on the mobilization situation by PAD and defense officials.

The NPC is scheduled to receive reports on a number of investigations which have been under committee study for some months. Among the subjects scheduled to be covered are oil and gas availability, the 1,000,000-bbl. expansion in output of products, liquefied petroleum gas, quebracho requirements, costs of producing synthetic-liquid fuels, petroleum truck transportation, trends in petroleum-consuming equipment, and underground storage for petroleum.

The gas-committee meeting will follow that of the council. Among the matters to be discussed are the question of conversion of one or more of the "Inch" lines back to oil transportation if such a request should be made by the Government, questions concerning the order of curtailments and interruptions of industrial service in the event of gas shortages, reports on studies made to determine industry requirements for natural gas and steel between now and 1955, a report on the materials situation, and a report on policy with regard to accelerated depreciation for tax purposes.

Steel for Drilling

NPA tells tubular-goods makers to step up output

WASHINGTON. — National Production Authority officials are putting pressure behind the oil industry's 1952 50,000-well drilling program.

Manufacturers of oil-country tubular goods have been told they must increase their first-quarter output of drill pipe to at least 29,000 tons if the program is to get off to a good start, and should concentrate on its production even if it involves some loss of tonnage in the over-all output of other oil-country tubular goods.

A tubular-goods industry-advisory committee estimated that, on the basis of existing facilities, total output of drill pipe should reach slightly more than 26,000 tons in the first quarter of next year. While short of the requirements estimated by the Petroleum Administration for Defense, this would be in excess of normal output.

Members of the committee, at a meeting with NPA officials last week, promised to explore the availability of conversion capacity.

Requirements.—The total oil-country tubular-goods requirements for the first quarter are estimated by PAD at 440,000 tons for domestic allocations, 45,000 tons for export, and 10,000 tons for Canada, a total of 495,000 tons.

Materials Allotments O.K.'d

WASHINGTON.—Operators unable to get shipments of controlled materials during the quarter for which they were first scheduled will be given allotments for such materials in the succeeding quarter, it has been announced by the Petroleum Administration for Defense.

This revalidation of claims was made necessary by a recent amendment of CMP regulations by the National Production Authority requiring that shipments of the controlled materials made later than 7 days after the end of the quarter for which scheduled must be charged against the consumer's allotment for the succeeding quarter.

PAD was successful in having oil-country tubular goods exempted from this requirement, but other materials under PAD control are subject to it.

In the case of projects expiring in the current quarter, PAD will revalidate third-quarter allotments to the extent that shipments of controlled materials were made after October 7. It will not be necessary, however, for operators to extend allotments for carry-over deliveries in cases where a project has been given an allotment for a single quarter only or where the carry-over occurs in the last quarter of the project.

WATCHING WASHINGTON

Bertram F. Linz

Construction Scoreboard

Construction projects totaling well over $3,000,000,000 have been submitted by the oil and gas industry since construction was put under control by the National Production Authority last June. Two-thirds of this program has already been approved by the Petroleum Administration for Defense.

A breakdown of this great expansion effort shows that $1,302,000,000 covers gas projects, primarily transmission lines. The oil industry proposes to spend $1,870,000,000—$845,000,000 for more refining facilities, $672,000,000 for construction of pipe lines and storage facilities, and $182,000,000 for natural-gasoline plants and allied facilities.

The projects submitted during the first 3 months of construction control, however, are only part of the over-all expansion program. Applications for construction permits and allocation of materials are coming in to PAD at the rate of about 130 a week, because of the limitations on materials, they must be winnowed so that the most important projects can be started first.

PAD statistics show that between June 13, when controls were imposed, and September 25 a total of $3,171,000,000 in construction projects were submitted, and $2,143,000,000 of this construction approved.

Officials believe that within a year the industry's total expansion will hit the $4,000,000,000 mark. That would be something like double the expenditure during the war.

Still Not Enough

An entirely new over-all program for oil-industry expansion is being worked out in the Petroleum Administration for Defense on the basis of an elaborate study of war-time petroleum needs prepared by the military.

The 1,000,000-bbl. per day expansion program, toward which PAD has been working, is based on studies made many months ago. Since then the military has substantially revised its ideas as to what and how much would be needed in the event of a shooting war.

It is no secret that defense officials some time ago reached the conclusion that the 1,000,000-bbl. program was too small.

The program now being studied will cover production, basic refining, aviation gasoline, other products and, so far as PAD has an interest, tankers, pipe lines, and other transportation.

Can It Be the Policy?

Britain's unhappy postwar experiences in the Middle and Far East have led to suggestions on both sides of the Atlantic that possibly the United States, too, may become the victim of its own efforts to build up underdeveloped areas.

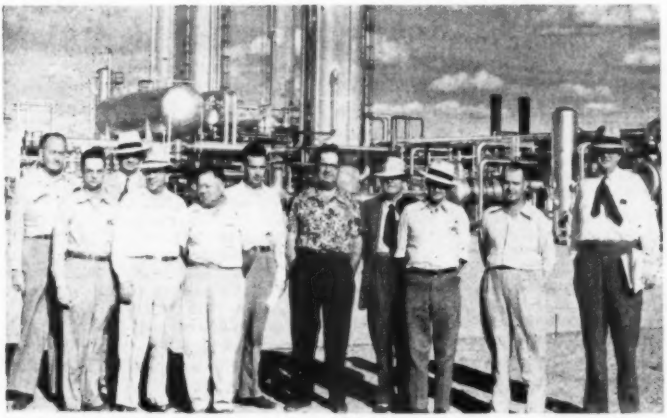
The English have been tossed out of Iran, India, and Burma, and are threatened in Egypt and Iraq. British political experts analyzing the cause of these disturbances say that industrial investments and loans, far from strengthening the resistance to communism, may actually be playing into its hands.

There is some argument to support this viewpoint. Investments and loans make a good base from which red agitators and corrupt or leftist politicians can gain popularity by demanding nationalization and repudiation, offering a Utopia in which the native government and people would enjoy all the profits that are being taken out by foreigners. The effectiveness of such a platform was demonstrated in Iran.

The United States already has had some experience with the "sanctity" of loans and concessions. It lost some $11,000,000,000 advanced to Europe during and following the first world war; oil company concessions in Mexico were expropriated some 15 years ago, and in the last war a lot of lend-lease had to be written off.

Now comes a suggestion from London that it might be more advisable to subsidize underdeveloped areas than to make loans or investments in fixed properties. The argument here is that with subsidies there would be only a financial loss, whereas with investments and loans, the loss, as in Iran, would be political as well as financial.

One thing appears to have been overlooked by the British experts. American oil companies, by and large, give a much better break to the countries in which they operate than have the oil companies of any other nation. So far, there has been no serious threat to their holdings and it could be that a square deal is bad medicine for the Communists.



AT PLANT DEDICATION.—This group was largely responsible for the building and operation of the Snyder gasoline plant, which was dedicated last week. Left to right: Ralph Johnston, Cities Service Oil Co.; L. G. Rodgers, Sunray Oil Corp.; C. R. Rogers, Lone Star Gas Co.; A. V. Murray, Sunray; Cal Birdsall, L. M. Lockhart; Max Lents, Scurry Natural Gasoline Corp.; H. W. Manley, Sunray; John Kendall, Lone Star Gas; John Craig, Skelly Oil Co.; Frank Perry, Cities Service; and Robert Boykin, Fullerton Oil Co. They comprise the plant advisory committee for 30 companies and 60 individuals.

Efficient Recovery

Snyder, Tex., plant uses deethanizing adsorber unit

SNYDER, Tex.—Use of a refinery process in a natural-gasoline plant makes the new Snyder gasoline plant one of the most efficient and largest in the world from the standpoint of recovery of liquid hydrocarbons from casing-head gas.

The unit is a deethanizing adsorber, into which the compressed gas is discharged from the compressors, and which absorbs all liquid products and leaves a dry residue gas for pipe-line use. With the ethane out of the liquid hydrocarbons, a minimum number of fractionating columns are needed for separation of commercial products. No reabsorber system is necessary, which further reduces the fractionating equipment and compressor horsepower.

Unique feature.—Another unique feature of the plant is the two-stage oil and gas separation with interstage heating on the leases. By incorporating this feature into the gathering system it was possible to effect important savings, including more than 1,000 tons of steel in construction, economies in the amount of fuel gas needed for plant operation, and reduction of stock-tank losses of gaseous hydrocarbons. In addition, this method permitted the conservation and sale of more than 3.4 billion cubic feet of casing-head gas during the 10 months the plant itself was under construction.

Underground storage.—One of the largest underground reservoirs for storage of liquefied petroleum gas is in use at the Snyder plant. Three storage wells, formed by washing out cavities in a salt bed found 630 ft. below the plant site, have a combined capacity of 3,700,000 gal. As compared with the conventional method of storage in pressure tanks, the underground storage brought a tremendous saving in capital investment as well as important savings in steel.

The new plant, officially opened last week, is operated by Sunray Oil Corp. for 30 companies and 60 individuals producing oil from the Canyon reef formation of Kelly-Snyder field. Although still undergoing tests, the plant has produced more than 473,000 gal. of liquid products from 50,000,000 cu. ft. of gas in a day, and is designed to handle ultimately 65,000,000 cu. ft. and produce more than 500,000 gal. of products daily.

Gas-Tax Battle On

Pipe-line firms act with protest payments to Texas

AUSTIN.—Opposition to Texas' new natural-gas tax law crystallized last week when several pipe-line firms paid the tax for September under protest.

This is the first step required under Texas law in a test of a law's constitutionality. The protestants now have 90 days in which to file suit. Most of them have indicated they will soon take the necessary legal steps to bring suit against the state.

The action was not unexpected by state officials, since most of the companies held up payment until shortly before the deadline.

Texas Gas Transmission Corp., of Owensboro, Ky., first to protest, sounded the keynote for the opposition with allegations that the law is unconstitutional, an unlawful burden on interstate commerce, and a violation of existing contracts between the company and producers from whom they purchase gas.

On October 29 a total of $842,098.41 had been collected. Of this total, $423,216.20 was paid without protest, and $418,882.21 paid with protest. A total of 73 reports were submitted under protest, and 109 without protest.

Big issue.—The $14,000,000 expected to be collected annually from the tax represents a large part of the state's budget. A special session is expected to be called by Governor Allan Shivers early this year *(The Oil and Gas Journal, October 25, 1951, page 153)*, and it is conceivable that if the suit were in court at that time, the legislature could take steps to amend the points in question. Thereby it could kill the suit and still collect the levy.

That the companies have ground to stand on isn't unfounded according to remarks by the state controller, who stated that deciding just who is and who isn't a gatherer of natural gas is one of the biggest questions.

Battle spreads.—The Texas Independent Producers and Royalty Owners Association, however, thinks differently. R. L. Foree, president, said that the interstate pipe-line companies are attempting to escape their responsibility to share in the cost of state government. He said that the gathering tax hardly could be termed excessive in view of the much larger taxes imposed by some consuming states when the Texas gas reaches their borders.

Foree claimed that the companies were attempting to induce producers and royalty owners to front for them in protesting the tax and thereby share with them the responsibility for paying it. Several independent companies are numbered among the protestants.

Although many companies have gone along with the state and paid the tax when the first payment was due, it does not mean that they are irrevocably committed to siding with the law. Many have felt that the law could have been worse, and it might be best to let "sleeping dogs lie." However, within the time between the filing of suits and their actual trial, these companies could lend their support to the protestants by also rendering their payments under protest.

GULF COAST

New Look at Tidelands

Letter by Chapman recognizing Mississippi's ownership of lands under state sound focuses new interest on question

JACKSON, Miss.—Because of a letter by Secretary of Interior Oscar Chapman to the governor of Mississippi recognizing state ownership of the submerged lands under Mississippi Sound, new interest has been focused on the problem of tidelands ownership.

J. P. Coleman, Mississippi attorney general, declared the ruling "clears all lands actually situated within the boundaries of Mississippi as defined by the State Constitution of 1890," and thus in effect concedes to the state all tidelands it claimed to own. The area was defined by the Interior Department as the inland waters of Mississippi Sound, comprising some 600,000 acres.

Sharp disagreement with Coleman's contention that the tidelands issue is now favorably settled for Mississippi was voiced, however, by Leander H. Perez, national director of the State's Rights Movement, and district attorney of Plaquemines and St. Bernard parishes, Louisiana. Perez contended that the controlling law on the state's boundaries was not the state constitution but rather the Act of Congress admitting Mississippi to the Union in 1817. The latter describes the boundaries as "extending 6 leagues (about 20 miles) from its shores including all islands therein," he said. Perez concluded that the Interior Department's "recognition" thus tends to deprive Mississippi of half of its submerged lands and their resources.

Leasing cited. — Coleman noted that last August the State Mineral Lease Commission had leased to Gulf Refining Co. and Melben Oil Co. "all lands lying within the boundaries of the State of Mississippi and/or the Gulf of Mexico" with the express purpose to obtain a ruling from the Interior Department. This lease includes the 600,000 acres of Mississippi Sound and an additional approximately 200,000 acres seaward. Although the ruling by the Interior Department did not clarify the status of all the acreage involved, it was reported by Sidney A. Swensrud, president of Gulf, that drilling for oil will be initiated within a year, as called for in the terms of the lease. While locations were not announced, it was indicated that they would be within the limited area of the sound.

Take up fight.—Elsewhere Swensrud and other oil-company executives took up the fight for state ownership of tidelands. He said he favored ownership by the states as a matter of principle and that he saw "no reason why it would serve our national defense to have the federal Government own the tidelands." Similar remarks were voiced independently by Walter S. Hallanan, president of Plymouth Oil Co., speaking at Corpus Christi, and Robert E. Wilson, board chairman, Standard Oil Co. (Ind.), speaking at New Orleans last week.

Dr. Wilson, while asserting that the submerged lands ought to be developed, also said that delay in Gulf of Mexico drilling had not really damaged the petroleum national-defense effort. Steel is a critical material in oil-field operations, he said, and lots of places remain on shore where oil can be found—more oil per ton of steel.

Deep Test Reported Fishing

Mississippi's "mystery well" is still shrouded in secrecy months after having come within only a few feet of setting a new world's depth record.

The well, George Vasen 1 Tung Oil Corp., 9-2s-11w, in Stone County, is reported fishing at a total depth of 20,450 ft. Fishing operations have been in progress for many weeks.

Latest report, not confirmed by the operator, is that 200 ft. of drill pipe was dropped a considerable distance to bottom, creating a gas blowout. Estimates of the flow were reported to have been about 50,000,000 cu. ft daily, with a 44 per cent sulfur content.

Prior to development of the current fishing job, Vasen reported plans to set some 20,000 ft. of pipe using a special plastic cement. The hole is now open below 14,038 ft.

The world's depth record was set by Superior Oil Co. in Sublette County, Wyoming, where a test was dry at 20,521 ft.

ROCKY MOUNTAIN

Barrier Lifted

"Potash area" opened for oil and gas development

WASHINGTON.—A 12-year barrier to oil and gas development of the so-called "Potash area" in Eddy and Lea counties, New Mexico, has been lifted by the Interior Department and 42,245 acres of potential oil and gas lands have been opened for noncompetitive leasing.

Applications for leases will be received by the Bureau of Land Management at its land and survey office in Santa Fe up to November 16.

The oil lands in potash area, which includes close to 300,000 acres of public and nonpublic lands with potential potash deposits, were withdrawn from leasing, except for a few tracts covered by outstanding leases or within the limits of a known geologic structure of a producing field, by an Interior Department order of February 6, 1939.

Special rules have been issued by the department covering applications for leases, which are to be filed on form No. 4-1158, second edition.

Each offer must cover all the federal land subject to noncompetitive oil and gas leasing contained in a particular section and must not cover more than one section. No offers will be accepted if the offerer's interests, direct and indirect, in leases and applications on federal lands in New Mexico exceed 15,360 chargeable acres, and no person who owns an interest of 10 per cent or more in a corporation or association filing for the federal lands in a section will be eligible to file a personal offer for the same area.

Stipulation.—Successful applicants for leases will be required to execute a stipulation agreeing that no wells will be drilled for oil or gas above the base of the Delaware sand or above a depth of 5,000 ft., whichever is lesser, except with approval of the director of the Geological Survey, and drilling to these formations will be permitted only if it does not interfere with the mining and recovery of potash deposits.

Unit plan.—No wells will be drilled below the base of the Delaware sand or a depth of 5,000 ft., whichever is the lesser, except under a unit plan approved by the Geological Survey, unless drilling is otherwise required or approved to protect the lease from drainage.

Provision also is made for both competitive and noncompetitive leases in other lands in the area not covered by the 1939 order. The same stipulation will be required and upon the discovery of any oil or gas pool or field embracing all or part of any nonunitized oil and gas lease heretofore issued, unit operation will be required unless it is shown to the satisfaction of the Secretary of the Interior that independent operation will not jeopardize maximum economic recovery of the oil or gas resources of the area.

Pipe Lines Being Pushed

12 major crude, products carriers, dozen natural-gas lines being rushed by PAD through allotments of pipe

WASHINGTON.—Twelve major crude and products pipe lines and a like number of natural-gas lines, all scheduled to be completed by the end of next year, are being pushed by the Petroleum Administration for Defense through allotments of line pipe.

While the number of lines is evenly divided between oil and gas, the pipe allotments are weighted heavily in favor of the latter because of the greater length and generally larger diameters of the gas lines.

When completed, these lines will add 1,289,700 bbl. daily of crude oil and product transportation and 3,244,000 M.c.f. daily of natural-gas transportation. They will represent an investment of more than $792,600,000 and some 1,500,000 tons of pipe, of which $238,982,000 and 583,000 tons will be for oil and $553,626,000 and 915,460 tons will be for gas.

Fourth quarter.—Line-pipe allotments granted by PAD for the current quarter are 193,870 tons for oil and 460,829 tons for natural gas.

Details of the lines for which PAD is giving priorities assistance include:

Crude lines:

Platte Pipe Line Co.—1,080 miles of 16 and 20-in. from Wyoming to Wood River, Ill.; initial capacity, 70,000 bbl. daily; estimated cost, $59,000,000; estimated completion date, third quarter of 1952; total line-pipe requirements, 128,871 tons; four-quarter allotment, 51,980 tons.

West Texas-Gulf Pipe Line Co.—577 miles of 26 and 20-in. from West Texas to Gulf Coast; initial capacity, 301,000 bbl. daily; estimated cost, $39,057,230; estimated completion date, third quarter of 1952; total line-pipe requirements, 130,000 tons; fourth-quarter allotment, 21,383 tons.

Sinclair Pipe Line Co.—683 miles of 24 and 22-in. from Drumright, Okla., to Salisbury, Mo., and Chicago; initial capacity 280,000 bbl. daily; estimated cost, $51,942,000; estimated completion date, fourth quarter of 1952; total line-pipe requirements, 144,010 tons; fourth-quarter allotment, 33,752 tons.

Ohio Oil Co.—117 miles of 20 and 22-in. from Wood River, Ill., to Lima, Ohio; initial capacity, 180,000 bbl. daily; estimated cost, $19,727,185; estimated completion date, December 1951; total line-pipe requirements, 23,619 tons; fourth-quarter allotment, 23,619 tons.

Shell Pipe Line Co.—64 miles of 8-in. from Gohlke field to existing trunk line; initial capacity, 15,000 bbl. daily; estimated cost, $2,500,000; estimated completion date, first quarter of 1952; total line-pipe requirements, 5,261 tons; fourth-quarter allotment, 1,329 tons.

Service Pipe Line Co.—30 miles of 20-in. loops on main line, Oklahoma to Chicago; increased capacity, 17,000 bbl. daily; estimated cost, $2,842,900; estimated completion date, second quarter of 1952; total line-pipe requirements, 5,261 tons; fourth-quarter allotment, 5,261 tons.

Continental Pipe Line Co.—105 miles of 8-in. from Rincon field to Port Isabel, Tex.; initial capacity, 17,000 bbl. daily; estimated cost, $1,935,000; estimated completion date, first quarter of 1952; total line-pipe requirements, 5,134 tons; fourth-quarter allotment, 2,567 tons.

Texas Pipe Line Co.—319 miles of 22, 12 and 10-in. from the Louisiana Gulf Coast area to Port Arthur; initial capacity, 145,000 bbl. daily; estimated cost, $18,717,430; estimated completion date, third quarter of 1952; total line-pipe requirements, 54,325 tons; fourth-quarter allotment, 9,046 tons.

Others.—Fourth-quarter allotment, 15,365 tons.

Products lines:

Phillips Petroleum Co.—932.5 miles of 8, 10 and 12-in. loops from Borger, Tex., to East St. Louis, Ill., to Chicago; initial capacity, 32,700 bbl. daily (to St. Louis); estimated cost, $20,883,450; estimated completion date, December 1951; total line-pipe requirements, 35,790 tons; fourth-quarter allotment, 13,263 tons.

Standard Oil Co. (Ind.).—125 miles of 8-in. from Neodesha, Kans., to Sugar Creek, Mo.; initial capacity, 12,000 bbl. daily; estimated cost, $3,532,000; estimated completion date, first quarter of 1952; total line-pipe requirements, 6,260 tons; fourth-quarter allotment, 6,260 tons.

Shell Oil Co.—565 miles of 14 and 8-in. from Wood River, Ill., to Chicago and Detroit; initial capacity, 85,000 bbl. daily; estimated cost, $15,850,000; estimated completion date, third quarter of 1952; total line-pipe requirements, 37,855 tons; fourth-quarter allotment, 6,970 tons.

Phillips Oil Co.—27 miles of 12-in. from Sweeney, Tex., to Freeport, Tex.; initial capacity, 115,000 bbl. daily; estimated cost, $1,502,230; estimated completion date, first quarter of 1952; total line-pipe requirements, 2,575 tons; fourth-quarter allotment, 2,575 tons.

Natural-gas lines:

Texas Eastern Transmission Corp.—826 miles of 30-in. from Kosciusko, Miss., to Connellsville, Pa.; intitial capacity, 382,000,000 cu. ft. daily; estimated cost, $74,815,000; estimated completion date, second quarter of 1952; total line-pipe requirements, 194,000 tons; fourth-quarter allotment, 67,700 tons.

Tennessee Gas Transmission Corp.—1,089 miles of 20, 26 and 30-in. looping and extension to New York-Massachusetts state line; initial capacity, 250,000,000 cu. ft. daily; estimated cost, $64,540,000; estimated completion date, second quarter of 1952; total line-pipe requirements, 141,000 tons; fourth-quarter allotment, 30,000 tons.

United Gas Pipe Line Co.—1,018 miles 29, 26 and 30-in. from Gulf Coast to Kosciusko, Miss., and Monroe, La.; initial capacity, 920,000,000 cu. ft. daily; estimated cost, $116,500,000; estimated completion date, third quarter of 1952; total line-pipe requirements, 223,500 tons; fourth-quarter allotment, 75,000 tons.

Texas Gas Transmission Corp.—600 miles of 26-in. looping and extension from Lake Charles to Monroe, La.; initial capacity, 260,000,000 cu. ft. daily; estimated cost, $46,126,000; estimated completion date, third quarter of 1952; total line-pipe requirements, 126,800 tons; fourth-quarter requirements, 15,000 tons.

El Paso Natural Gas Co.—Field facilities, compression and looping; initial capacity, 100,000,000 cu. ft. daily; estimated cost, $23,494,000; estimated completion date, first quarter of 1952; total line-pipe requirements, 9,200 tons; fourth-quarter allotment, 9,200 tons.

Northern Natural Gas Co.—125 miles of 24-in. looping; initial capacity, 130,000,000 cu. ft. daily; estimated cost, $36,497,000; estimated completion date, fourth quarter of 1951; total line-pipe requirements, 17,900 tons; fourth-quarter allotment, 2,700 tons.

Colorado Interstate Gas Co.—246 miles of 16-in. looping and extension; initial capacity, 80,000,000 cu. ft. daily; estimated cost, $12,281,000; estimated completion date, fourth quarter of 1951; total line-pipe requirements, 29,300 tons; fourth-quarter allotment, 3,400 tons.

Houston Pipe Line Co.—85 miles of 18, 24 and 30-in. looping; initial capacity, 155,000,000 cu. ft. daily; estimated cost, $8,649,000; estimated completion date, fourth quarter of 1951; total line-pipe requirements, 20,640 tons; fourth-quarter allotment, 16,640 tons.

Manufacturers Light & Heat Co.—144 miles of 16-in. from Clinton County to Pittsburgh, Pa.; initial capacity, 105,000,000 cu. ft. daily; estimated cost, $9,706,000; estimated completion date, fourth quarter of 1951; total line-pipe requirements, 15,400 tons; fourth-quarter allotment, 15,400 tons.

New York State Natural Gas Co.—220 miles of 16 and 20-in. from Ithaca to Albany, N. Y.; initial capacity, 53,000,000 cu. ft. daily; estimated cost, $15,315,000; estimated completion date, fourth quarter of 1951; total line-pipe requirements, 17,000 tons; fourth-quarter allotment, 13,500 tons.

United Gas Pipe Line Co.—336 miles of 20, 24 and 30-in., Refugio, Houston, Beaumont, Tex.; initial capacity, 435,000,000 cu. ft. daily; estimated cost, $14,380,000; estimated completion date, fourth quarter of 1951; total line-pipe requirements, 43,420 tons; fourth-quarter allotment, 27,320 tons.

Texas-Illinois Natural Gas Pipeline Co.—1,259 miles of 20, 26 and 30-in. from Gulf Coast to Chicago; initial capacity, 374,000,000 cu. ft. daily; estimated cost, $121,323,000; estimated completion date, fourth quarter of 1951; total line-pipe requirements, 77,300 tons; fourth-quarter allotment, 2,500 tons.

Buckeye Line O.K.'d

Construction to start in spring on products system

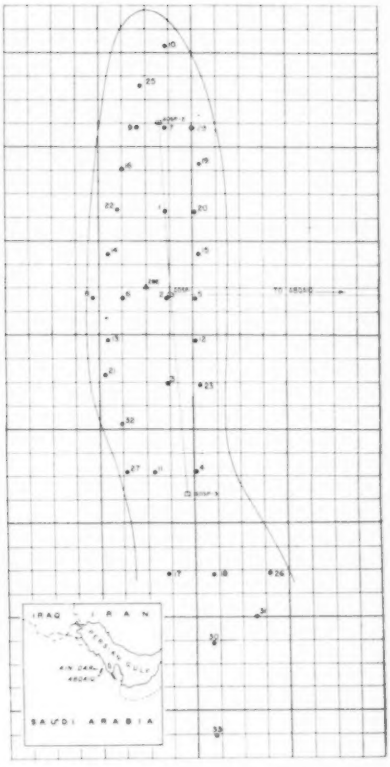
NEW YORK.—Construction of an eastern products-pipe-line system will be started early next spring by Buckeye Pipe Line Co. Approval for the entire 370-mile project serving Pennsylvania and New York State has been granted by Petroleum Administration for Defense.

Controlled materials have been allocated for the first leg of the line from Linden, N. J., to Allentown, Pa., for the first quarter of 1952, and further allocations are anticipated as needed.

The new system, which will be known as the Eastern Products Division of Buckeye, will be a common carrier, distributing petroleum products from the deep-water port at Linden to inland points in eastern Pennsylvania and Central New York.

The company has made one major change in plans announced last spring *(The Oil and Gas Journal, March 15, 1951, page 51)*. The 75-mile Linden-Allentown spread will be increased in size from the original 14-in. to a 16-in. line and the proposed 60-mile leg from Marcus Hook, Pa., to Allentown will not be laid.

DRILLING AT AIN DAR.—This National 75 rig is being used by Arabian American Oil Co. in Ain Dar field, Saudi Arabia, and is currently drilling Well 29 in the north portion of the area. Inset is Aramco Driller E. E. Stewart, with part of his all-Arab crew in the background.



FIELD WELLS.—Map showing location of wells drilled in Ain Dar field. Inset map shows location of field in relation to Saudi Arabia.

MIDDLE EAST

Aramco's Ain Dar Field

Remarkable story of planned development told in record of drilling in huge oil reservoir during past 3½ years

Dahl M. Duff

A REMARKABLE story of the planned development of a major oil reserve by a single operator is told in the record of drilling in Ain Dar field in Saudi Arabia during the last 3½ years.

To fix the field's limits as quickly as possible, 3½-mile stepouts were made down the long axis of the structure. These were coupled with occasional profile wells, also widely spaced. As a result, by the time only eight wells had been drilled, a section of the field some 14 miles in length had been proved.

The success of Arabian American Oil Co.'s drilling program at Ain Dar reflects particular credit on the exploration work which preceded it. The practices carried out were made possible by the size of the field itself, and the greater freedom of development when the entire area is under control of one company such as is the case in most foreign operations.

The Ain Dar discovery well was spudded April 10, 1948, and completed as a potential producer the following July. The location was 27 miles west of the center of Abqaiq field, the principal producing area of Saudi Arabia.

Structure-drill discovery.—The structure was located on the basis of structure-drill work following reconnaissance gravity-meter investigation. Structure drilling forms an important part of Aramco's exploration technique. Information from these structure holes has led to the discovery of other Saudi Arabian fields.

As at Abqaiq, the Ain Dar production was found in the D member of the Arab zone which is believed to be Upper Jurassic. Average depth to the bottom of the producing formation is 7,200 ft. There is also a negligible amount of oil in the C member.

After the discovery and through the first three quarters of 1950, the company kept one rig working in the field. During this period of 29 months, 10 additional wells were drilled. In the fourth quarter of last year, a second string was added, and since the first of this year, four rigs have been in operation. The rate of drilling has been coordinated with the construction of separator facilities and pipe-line outlets.

The discovery was followed by Wells 2, 3, and 4. Each of these was drilled on 18,000-ft. stepout locations to the south along the main north-south axis of the anticline. The next step after No. 4 was to obtain a cross profile. No. 5 was drilled 6,000 ft. east of No. 2 and No. 6, 9,000 ft. west of No. 2. These three wells indicated the position of the north-south axis. For No. 7, the rig was moved 18,000 ft. to the north of the discovery. Its completion gave additional length to the area already outlined.

Oil-water contact.—The next problem was that of locating the oil-water contact in the reservoir. This was the objective of Well 8 which was located 6,500 ft. farther west of the end profile well, No. 6. No. 8 intersected water in the pay zone, thus bearing out the calculations as

to the probable point of the oil-water interface.

With the completion of No. 8, the company had five wells along a north-south line with three other wells crossing east and west through the center. The eight wells completed to that time outlined 70,000 ft. of oil field and definitely located the west limit. From this, the east limit could be deduced.

Continuing its program, Aramco then drilled No. 9 for another profile to show the position of the main axis on the northern plunge of the field. This well was 6 000 ft. west of No. 7 and was found to be in the same structural position, showing the axis to be between the two locations. Well 10 which was another 18,000 ft. north of No. 7 placed the field's north limit, although it did not find water in the formation. This left the south end of the field as the only direction not defined.

Ring spacing.—The wells drilled to this point had all been semiexploratory in nature. For the development wells, the ring-spacing plan was followed. The objective is to locate the producing wells at the best possible point between the oil-water contact and the top of the structure. It avoids having the well go to either gas or water as depletion takes place and thus promises maximum producing life. Ring spacing has been successfully used at Abqaiq and Kirkuk in Iraq.

At Ain Dar, the 6,100-ft. contour was decided on as the optimum for the producing wells on ring spacing. Well 8 had been turned into an observation well to provide information on the aquifer. Except for the early exploratory wells, the wells drilled were in good position for field development on the 6,100-ft. contour. They were within a range of about 40 ft., plus or minus, of the contour line chosen.

A 9,000-ft. spacing between the development wells was considered the best for maximum drainage and economic development. One rig has been working continuously in this northern section of the field, and the two more wells needed to complete this phase of the program will be drilled by January.

Second rig moved in.—To the south, the field still lay undefined, and beginning with the fouth quarter of last year, the company moved in a second rig to continue the exploratory work in this direction. Following the completion of No. 10 which gave the north limit, a new cross profile was sought through the then southernmost well, No. 4. Well No. 11, 10,000 ft. west of No. 4, was approximately the same structurally as No. 4 and provided new information on the location of the main axis.

Nos. 17, 18, and 26 also were profile wells but on a new lateral line farther south. No. 17 was 22,000 ft. south of No. 11, and No. 18, 10,000 ft.

Ain Dar field is an example of how progress can be made when one company has complete control of an area

east of No. 17. An interesting feature of all this profile drilling was that a few of these wells were diamond cored with very good recovery, giving excellent control on the reservoir rocks.

No. 26 was 12 000 ft. to the east of No. 18. The three wells, Nos. 17, 18, and 26 gave evidence of a second "high" to the field. No. 26, however, was structurally lower than expected, only about 300 ft. above water, and its position ruled out the concept of a major eastern bulge to the structure.

Continuing to the south, the company drilled Well 30 on a location 15,000 ft. south of No. 18. No. 30 proved to be the highest structurally in the field to the present. Currently drilling is the exploratory well No. 33 which is another 18,000 ft. south of No. 30.

Uthmaniyah structure.—In January of this year, Aramco spudded in a wildcat on the Uthmaniyah structure at a location about 41 miles south and slightly east of the original Ain Dar discovery. This was another gravity-meter and structure-drill prospect. The Uthmaniyah well subsequently was completed as a potential producer, also in the D member of the Arab zone.

Three wells have been completed in this new field, and two rigs are in operation. Uthmaniyah will be drilled along the same general plan as was followed at Ain Dar. The only exception likely will be greater distance between each line of profile wells. This may be as much as twice the 18,000 ft. adhered to at Ain Dar. At Uthmaniyah, the second well was a 10,000-ft. lateral stepout to the west. No. 3 was located 50,000 ft. north of the discovery, while No. 4, now drilling, was 8,000 ft. farther to the west of No. 2.

The full extent of Uthmaniyah is, of course, unknown, and whether it will reach north toward Ain Dar is a question that can be answered only by additional drilling. The company's program for next year calls for active development of Uthmaniyah.

Drilling technique.—In Ain Dar field, drilling technique has been much the same as that in Abqaiq. Water with a complete loss of return, and the static mud cap have been used to combat zones of lost circulation. Drilling time has averaged about 55 days, with another 5 days for moving the unitized rig. The normal casing program is 18⅝-in. for surface water, 13⅜-in. separating the zones of different pressure, 9⅝-in. for lost circulation, and 7-in. at the top of the producing formation.

Before spudding in, a water well is located within a radius of 20,000 ft. or less of the location. Water is found at a depth of about 650 ft. Usual practice is to lay a 6-in. water line using invasion pipe fitted with Victaulic couplings.

The Ain Dar wells came in at a maximum of about 16,000 bbl. daily, and those now connected are producing at about 14,500 bbl. daily. Gas-oil ratio is 620. It is estimated a total of about 50 wells will be required to fill in the field as now indicated.

Separator plant.—Ain Dar began commercial production January 6 of this year following completion of Gas-Oil Separator Plant 1 and a 22 and 24-in. pipe line to the stabilization plant at Abqaiq. The Ain Dar separator plant is located near Ain Dar No. 2 and serves those wells within about 20,000 ft. either north or south of the station. The 6-in. flow lines average about 15 000 ft. in length.

The separator plant has a nominal capacity of 100,000 bbl. daily, but is now handling approximately 150,000 bbl. daily. Three stages of separation are used, 460 psi., 65 psi., and 5 psi. Horizontal vessels are used for the first two stages, and a Hortonsphere for the final stage. The setup for testing individual wells consists of smaller, high-pressure vessels and a second Hortonsphere.

The field's second separator station is located 38,000 ft. north of the No. 1 plant and will serve wells in the north end of the field. By next January, the third station is to be completed near Ain Dar Well 4. Nominal capacity of all three stations is the same, or about 100,000 bbl. daily each.

Pipe line.—The pipe line from Ain Dar to the stabilizer at Abqaiq uses gravity flow to provide an outlet for the oil from Separator Plant 1. A pump station is under construction which will raise capacity of this line to about 350,000 bbl. daily. Tie lines will bring crude from Separator Plants 2 and 3 to the pump station at Plant 1. The three pumps for crude from each of the stations will be driven by 800-hp. gas-expansion turbines using gas from the high-pressure stage of separation.

The company expects to bring Uthmaniyah on production as early as possible. The new field's first separator plant is expected to be started in January and be completed by the middle of the year. During the same period a 30 and 31-in. pipe line will be laid north and east from the area of Uthmaniyah well No. 3 to Abqaiq. Its length will be about 50 miles.

This 30 and 31-in. line also will serve the projected Ain Dar Separator Plant 4 which is to be built in the south extension of the field. A 20 and 22-in. line will extend from the Ain Dar Plant No. 4 south and east to tie into the main 30 and 31-in. This line will be 6 or 17 miles in length, depending on the route finally chosen.

U. S. Tries Its Hand

Attempts continuing in Washington to find solution to Iran-British problem; State Department seeking accord

ATTEMPTS were continuing in Washington this week to find a solution to the Iranian oil problem.

There were many rumors of a pending agreement permitting the reopening of Iran's petroleum industry, but neither the British, the Iranians, nor representatives of the neutral United States would confirm publicly any of the reported plans.

One rumor was of an agreement under which the Royal Dutch-Shell group would take over the marketing of Iranian oil. Under this reported plan, Iran would operate its producing and refining facilities with the aid of hired foreign technicians, including former employes of Anglo-Iranian Oil Co., Ltd.

Another rumor receiving wide circulation was that State Department officials are urging Britain and Iran to agree on a plan under which products now in storage at Abadan will be put on the market immediately.

Urged to agree.—Officials said Iran is being urged to agree to this step as a preliminary move leading to a resumption of negotiations with the British. State Department officials were said to feel that making the stored products available to the western world should be a prerequisite to any reopening of discussions on the nationalization issue between the two principal countries. This was based on the accepted belief that it would be weeks, and possibly months, before producing and refining operations could be returned to normal even after an agreement on the nationalization problems.

Oil expert arrives.—Arrival in Washington last week of Kazem Hassibi, Iran's chief oil expert, was viewed at some quarters as an indication that the mediation of President Truman, Secretary of State Dean Acheson, and other officials was meeting with some success. The extension by Premier Mohammed Mossadegh of his stay in this country also was looked upon as an encouraging sign.

Some officials expressed the hope the Iranian premier, away from the heated emotionalism in his own country for a period of time, might be more amenable to American suggestions of a compromise.

Dutch-Shell plan.—Reports concerning the proposed arrangement with the Dutch-Shell group said the plan was proposed by Samuel Nikasian, Washington attorney and former oil-pricing head of the Economic Cooperation Administration who now is acting as an adviser to the Iranian Government.

Under this plan Shell would have a 25 to 30-year marketing contract covering about 75 per cent of Iranian oil production. The remaining fourth would belong to the Iranian Government to market as it wished.

Current negotiations, reports said, are over the price to be paid by the Shell Group for the Iranian oil.

Since confiscation of the refinery and field facilities of the British company, and in view of the pending action in the case by the International Court of Justice, it is believed that approval of the British to the plan would be essential to its adoption.

As yet, no comment on the proposal has been forthcoming from the British.

British Oil Purchases Grow

Total purchases made in the United States by British interests for the replacement of supplies formerly taken from Abadan now stand at 26,545,000 bbl.

Asiatic Petroleum Corp., the Royal Dutch-Shell affiliate in charge of the purchasing program, reported last week that it had bought an additional 3,637,000 bbl., including 1,075,000 bbl. of products and 2,562,000 bbl. of crude oil.

Last week was the first time that the company asked offerings for lifting in the first quarter of 1952. The purchases last week included 784,000 bbl. of products, including 400,000 bbl. of distillate for shipment the first 3 months of next year.

Since the purchasing program began in July a total of 50,843,000 bbl. of crude and products have been bought from all American-owned sources. Besides the 26,545,000 bbl. from the United States, 21,960,000 bbl. from the Middle East and 2,338,000 bbl. from the Caribbean also have been purchased by the British.

European Wrinkle

Newest development in transportation abroad is this pint-sized liquefied petroleum gas "tanker," which will operate between Shell's Pernis refinery, near Amsterdam, and market outlets in Ghent and Brussels, Belgium. The Butania II, shown here, and its sister ship, Butania I, have just been put in service by N. V. Internationale Rivieretankscheepvaart, Mij., a Shell affiliate. The tankers can carry about 1,000 bbl. and make a round trip in 3 days. Cost of each was about $112,000. The vessels are equipped with two 40-ft. horizontal cylindrical tanks 12 ft. in diameter. Maximum working pressure is 100 psi. Shell officials say the excellent waterways in Holland and Belgium make water transportation of L.P.G. far cheaper than road or rail movement.

Iraq Contract Let

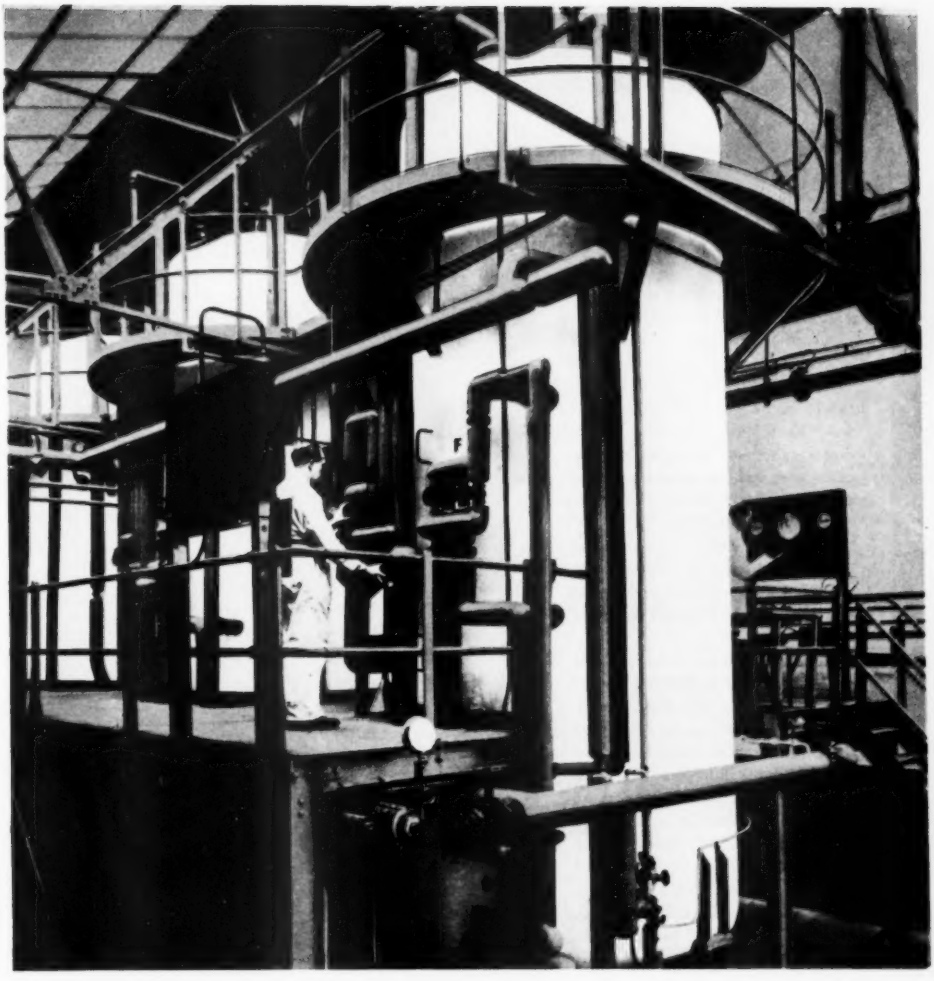
Kellogg to built I.P.C.'s 25,000-bbl. Dourah plant

THE Iraqi Government last week announced that M. W. Kellogg Co. has been awarded a contract for construction of a 25,000-bbl. refinery near Baghdad. Cost is estimated at $25,000,000.

The government announcement said the refinery will be erected on a site at Dourah village near Baghdad. A 12-in. crude line will bring oil from producing fields, it said.

In making the refinery announcement, Premier Nuri Pasha Al Said reiterated his determination to oppose any suggestion for nationalization of the country's petroleum industry.

Standing pat.—Declaring Iraq, through a pending agreement giving the country half of Iraq Petroleum Co.'s profits, had already achieved the object of nationalization, the premier said: "We are going to receive more oil royalties than neighboring countries are receiving from the oil. . . . Meanwhile, I am still



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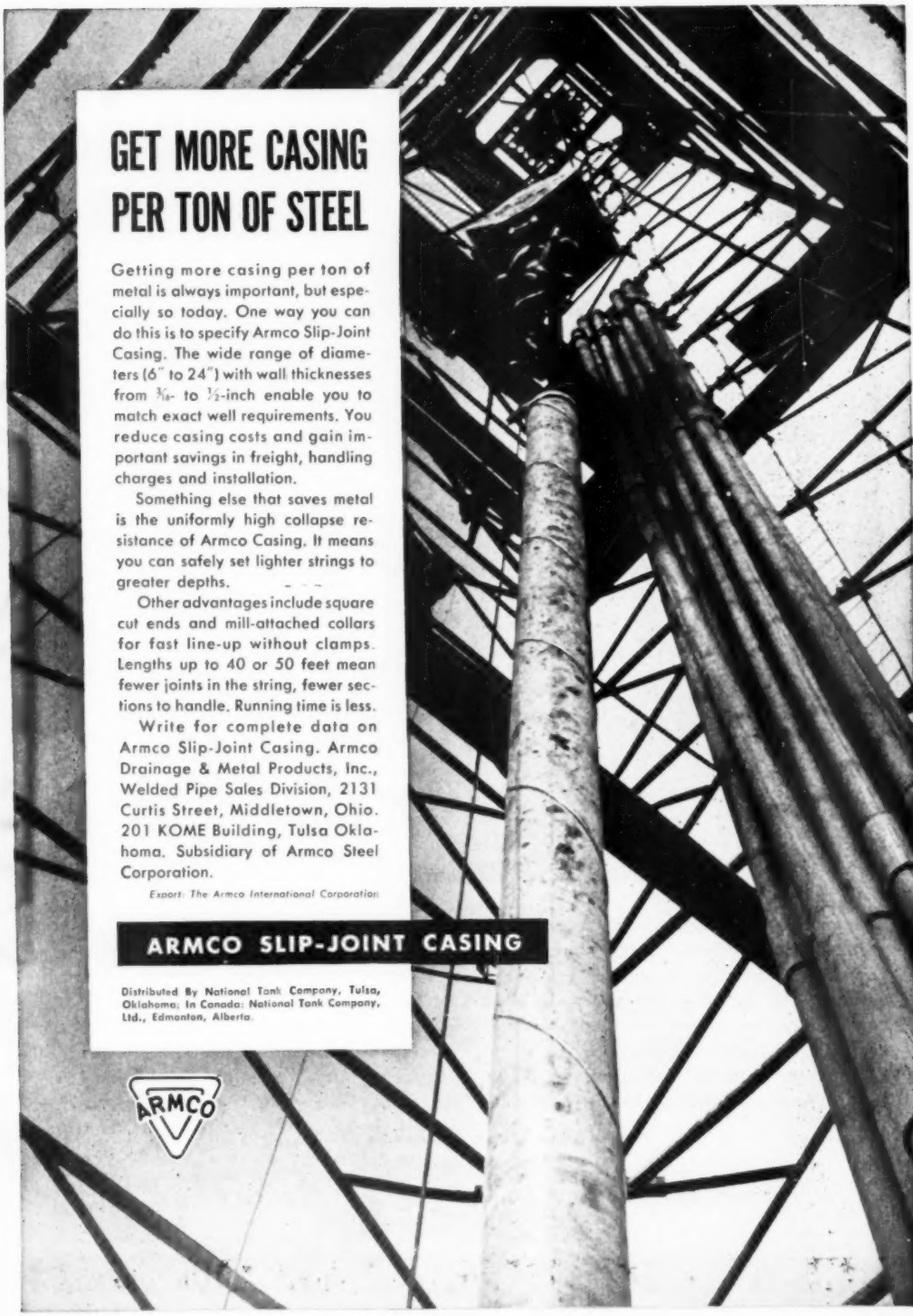

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Getting more casing per ton of metal is always important, but especially so today. One way you can do this is to specify Armco Slip-Joint Casing. The wide range of diameters (6" to 24") with wall thicknesses from 3/16- to 1/2-inch enable you to match exact well requirements. You reduce casing costs and gain important savings in freight, handling charges and installation.

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ready to ask for more royalties if Iran, after settling its dispute, may receive more."

Earlier he had pointed out that Iraq is in no position to take over the petroleum industry and pay compensation for the facilities and then operate the industry and sell its oil.

Referring to the action in Iran, he added: "It is more logical that we should be more patient in striving for our national aims."

The agreement between the government and I.P.C. is now being framed for presentation to the Iraqi Parliament, which will meet in November or December to ratify or reject the document.

ASIA

Burma May Buy In

Government eyes British offer to sell oil interest

THE Government of Burma intends to nationalize the oil industry in that country, but not in the manner in which Iran took over her petroleum facilities.

Burma's premier, Thakin Nu, in a press conference said nationalization in that country will take place in an orderly manner "and in slow stages." Also, he said, nationalization will be accomplished by purchase of the oil facilities rather than through confiscation.

Nationalization has been a heated subject in the Burmese political picture since long before the flareup in Iran. In 1948, in fact, the Burmese Government proposed that it advance funds to Burmah Oil Co. (Burmah Concessions), Ltd., for rehabilitation of its war-damaged facilities and thus acquire an interest in the company.

This advance was never made, but in the years since there have been continuing negotiations between Burma and the British over the purchase of an interest in the oil company.

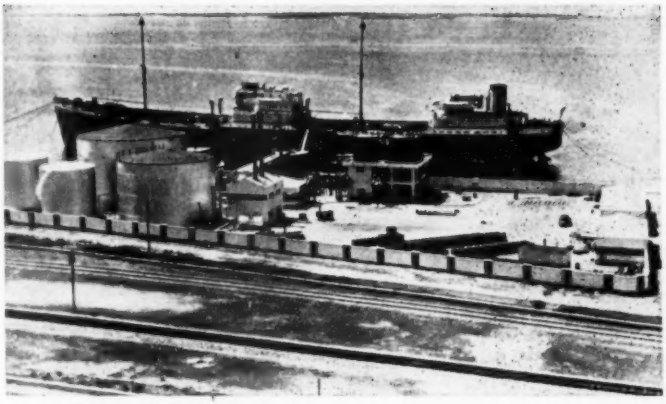
Partial payment.—At present the Burmese Government is considering a plan submitted by the company and the British Government under which Britain would lend Burma $7,000,000 for use as a partial payment in the purchase of a one-third interest in Burmah Oil. A similar amount, under the plan, would be paid the company over a period of years through the government's income from its interest.

Burma earlier had asked for a $14,000,000 loan in order to make an outright purchase of the third interest, but Britain countered with an offer of half that amount.

Rough road.—The country's oil industry has traveled a rocky road since early in the war. Before the war the country had a production of more than 21,000 bbl. daily and refineries had a combined capacity of about 27,000 bbl. per day. These facilities were virtually destroyed during the Japanese invasion.

After the war the British company undertook an extensive rehabilitation program, but it was hampered by uprisings and political strife. As late as early 1950 normal operations were still only a dream and production and refining activity was at a low ebb.

Recently, however, more settled conditions have permitted a stepup of operations, and the company last month began drilling its first postwar wells. The drilling project, in the Chauk area, is designed to provide a firm supply of crude for the refinery at Chauk.



New Bulk Asphalt Terminal

Royal Dutch-Shell has placed in operation at Setubal, south of Lisbon, in Portugal, the second of three bulk asphalt terminals being built in Europe. The plants are designed to receive asphalt by direct tanker delivery from Shell's Caribbean refineries. Formerly special asphalt feedstocks were shipped from Venezuela to Rotterdam for refining, packing, and distribution to European consumers. Pictured here is the Labiosa, one of three specially converted Shell tankers which carry asphalt in coil-fitted tanks. The Setubal plant has a capacity to handle about 6,000 tons of asphalt. Similar installations are at Provestenen in Denmark and in Dublin, the latter due to be completed by the end of this year. (Shell photo.)

LATIN AMERICA

Bolivian Loan Considered

Decision as to whether the United States will loan Bolivia $3 000.000 for development of its presently operating oil fields is due to be made next month by the Export-Import Bank following the return to Washington of Don Carroll. Carroll on loan from the Defense Production Administration, is leaving this week for a survey of the Bolivian oil industry.

The $3,000,000 loan would be in addition to an $8,500.000 credit set up by the Export-Import Bank several years ago through which, among other things, Bolivia financed the construction of its refinery.

In line with its previous policy, the bank is expected to require Bolivia to employ experienced American oil men to supervise the additional drilling contemplated, as was done in the case of the construction of the refinery.

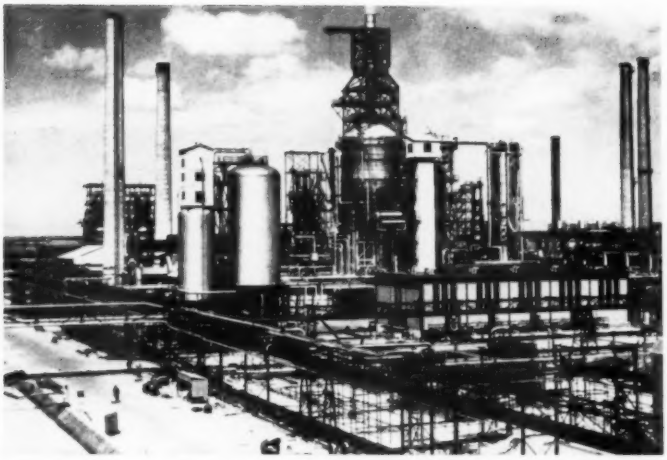
It is also suggested that a suggestion will be made that the Bolivian oil agency confine its activities to the three areas now being produced and that other areas be opened to exploration and development by private capital. This would enable the government to secure dollar exchange needed for repayment of its loans and other purposes.

Rabon Grande Growing

Rabon Grande, Mexico's new Veracruz field discovered by Mexican American Independent Oil Co. in June, now has three good producers and two more wells being drilled.

Oil from the first three completions has started moving to the Minatitlan refinery through a newly completed line to the field laid by Petroleos Mexicanos, the government oil agency. The line was laid from Rabon Grande to Pemex's Nanchital tank farm, which has connections to the refinery.

A Pemex announcement said the discovery well and the second and third completions together were flowing at the rate of 1,200 bbl. per day.



***ANOTHER FOR EUROPE.**—Here is a view of a new catalytic cracking unit of approximately 25,000 bbl. daily capacity which has been constructed at the Pernis, the Netherlands, refinery of the Royal Dutch-Shell Group. The fluid unit is the first modern-type catalytic cracking installation to be completed in Europe and is a part of the expansion program which has been under way at the Pernis plant since end of the war. Successful construction of numerous units such as this has led OEEC to declare that establishment of a major European refining industry is now a reality. By mid-1953 Europe will be producing about 1,300,000 bbl. daily. (Shell photo.)*

Only one well, RG 7, has been abandoned as dry.

Mexican American, known in Mexico as CIMA, is owned by American Independent Oil Co., Petrofina, and E. W. Pauley and holds a percentage-of-production contract with Pemex. The company earlier drilled the Xicalango and Tortuguero structures.

EUROPE

French Refinery Aid Set

The Economic Cooperation Administration has earmarked $820,000 in dollars to assist in the construction of modern catalytic cracking facilities in Donges refinery near Bordeaux and the Shell-Berre refinery near Marseille, France.

At the Donges plant, $400,000 will go for payment of engineering fees and $170,000 for materials and equipment to be procured in the United States. The Shell-Berre refinery will receive $195,000 for engineering costs and $55,000 for materials and equipment from this country.

The actual procurement authorizations covering the ECA-financed part of the projects will not be issued, however, until France has received its allotment of ECA funds for the current fiscal year. The allocation of funds has been delayed because of the failure of Congress to pass the foreign-aid appropriation bill until this month.

A.I.O.C. Expands Refineries

Anglo-Iranian Oil Co., Ltd., currently is expanding the capacities of two small German refineries which it purchased recently.

The refineries are the 2,800-bbl. refinery at Neuhof (Hamburg) and the 280-bbl. lube-oil plant at Peine (Hannover). The refineries were purchased by A.I.O.C. through the company's German subsidiary, BP Benzin und Petroleum, GmbH.

Reports from Germany say the company plans to install a second fractionating column at Neuhof, increasing crude-oil throughput by about 500 bbl. per day and permitting a greater range of products. The Peine plant will be doubled in capacity with production upon completion to include gasoline, diesel fuel, and asphalt, in addition to lubricating oils and greases.

The expansion program is expected to be finished next January.

Synthesis Process Successful

Use of steam to replace hydrogen in the synthesis of liquid fuels and hydrocarbon chemicals has been proved feasible, according to two German chemists.

Dr. Hans Koelbel and Dr. Friedrich Englhardt described the new process at the annual meeting of the Association of German Chemists in Cologne.

The new process, they said, would make possible a greatly increased production of liquid fuels at a much lower cost than has been possible in the German Fischer-Tropsch synthesis plants. In the new process coal gas is mixed with steam and directed over a catalyzer at a temperature from 180° to 290° C.

Operation of Fischer-Tropsch plants was prohibited by the occupying powers after the last war. While the ban since has been lifted, the war-developed synthesis process is considered too expensive, due to the high cost of hydrogen, for commercial use.

AUSTRALIA

A.I.O.C. Refinery Sought

The government of Western Australia is hoping to induce Anglo-Iranian Oil Co., Ltd., to build in that area a large new refinery it is tentatively planning for Australia.

The minister of works for the western state went to Melbourne recently to discuss the matter with Anglo-Iranian representatives, who are in Australia to study the prospects for construction of a new refinery in the country.

Reports from Australia have said the company is planning a 50,000 to 70,000-bbl. refinery, but Anglo-Iranian officials have described the report as "premature," until the ultimate disposition of the huge Abadan, Iran, refinery is known and until the attitude of the Australian Governmen on participation in the proposed new refinery project becomes clear.

International Briefs

Salt water from the Persian Gulf is now yielding 720,000 gal. of fresh water daily through a new process employed by Kuwait Oil Co. A three-step distillation process, using three evaporators and one condenser yields more than 2½ lb. of fresh water per pound of steam. The company formerly used a single-step process with a yield of less than 1 lb. of water per pound of steam. Natural gas is used as fuel to supply steam for the distillation plant.

Exploratory drilling in six potential oil basins in Afghanistan is expected shortly to get under way under the guidance of a Dutch mining engineer who has had wide experience in oil drilling and production, assigned by the United Nations. The Afghan Government is anxious to develop a domestic oil supply and refining facilities to provide fuel oil needed to supplement dwindling wood resources for domestic heating and industrial development, gasoline, and asphalt for roads and building material. Afghanistan was the first nation to contract with Iran for petroleum products left on its hands by the cessation of operations by the Anglo-Iranian Oil Co.

PERSONALS

New B-A Chairman

Beringer succeeds W. K. Whiteford as board head

MILTON S. BERINGER has been elected chairman of the board of directors of British American Oil Co., Ltd., Toronto, succeeding William K. Whiteford, who has resigned to join Gulf Oil Corp. as executive vice president and director.

Beringer, who joined British American 18 years ago, has been vice president of manufacturing for the past 6 years, and was appointed a director of the company in 1950. He is also vice president of B. A. Shawinigan, Ltd., a new petrochemical company formed to manufacture acetone and phenol.

The new chairman, before joining B-A in 1934, was with Arthur G. McKee Engineering Co. Prior to that he was with the old Sapulpa Refinery Co., and later with Continental Oil Co. He supervised construction of B-A's Turner Valley absorption plant, the Calgary refinery, and the Montreal refinery at Clarkson, Ont.

In 1943 Beringer was appointed assistant general manager of B-A's manufacturing department, becoming general manager in 1945.

James Y. Murdoch has been elected chairman of the executive committee of the board of directors of British American Oil Co., Ltd., Toronto. He has been a director for 18 years.

B. C. Broocks, superintendent of the Corpus Christi district for Sun Oil Co., has been appointed regional superintendent of production in Sun's Southwest Division with headquarters at Dallas. He succeeds **Marvin L. Brown,** who recently moved to Calgary, Alta., Canada, as superintendent of production for the firm's Canadian division. **Robert E. Bates,** drilling superintendent in Southwest Texas for 12 years, will succeed Broocks as district production superintendent at Corpus Christi. Other changes include: **George F. Carson,** field superintendent of the Delhi, La., area, transferred to Corpus Christi and named assistant district superintendent; **C. W. Underwood,** district petroleum engineer at McAllen, Tex., promoted to assistant district superintendent there; **Cecil A. Colville,** field superintendent at Premont, Tex., transferred to Midland, Tex., as assistant district superintendent; **R. P. Smith,** assistant field superintendent at Dallas, transferred to Tyler, Tex.; **J. T. Hightower,** field superintendent at Colorado City, Tex., transferred to Dallas in the same capacity; **J. B. Higginbotham,** assistant field superintendent, transferred from Dallas to Hebbronville, Tex.; **H. P. Aston,** from assistant field superintendent at Midland, Tex., to field superintendent in charge of the Delhi area; **H. D. Smith,** from assistant field superintendent in charge of Robert Lee area, West Texas, to assistant field superintendent in charge of the new Copano Bay area; **C. C. Bengston,** from district engineer at Midland to assistant field superintendent in charge of the Robert Lee area; **L. J. Thornson,** from assistant field superintendent in charge of the Freer area, Southwest Texas, to field superintendent in charge of the Premont area; **J. V. Prestridge,** from foreman at Victoria, Tex., to assistant field superintendent in charge of the Freer area; **P. S. Dudley,** from assistant field superintendent at Hebbronville, to Gainesville, Tex.; **E. L. Kownslar,** from assistant field superintendent at Snyder, Tex., to field superintendent at Colorado City; **Max Dyer,** from assistant field superintendent at Gainesville, to Snyder; **R. J. Bethancourt,** from field petroleum engineer at Freer to Dallas for an engineering assignment; **W. J. Turner,** from field petroleum engineer at Premont to district engineer at McAllen; **B. W. Payne,** from field petroleum engineer at Corpus Christi to Premont in similar capacity; and **George P. Moncrief,** from petroleum engineer at Colorado City to district engineer at Midland.

M. E. McCullough, a partner in the firm of Fain & McGaha, Wichita Falls, Tex., has been elected vice president of the Texas Mid-Continent Oil & Gas Association's North Texas district. He succeeds **R. Clay Underwood,** Wichita Falls independent operator. McCullough is president of the North Texas Oil and Gas Association and is a director of the West-Central Texas Oil and Gas Association.

William G. Abott, field engineer for Amerada Petroleum Corp. at Fort Worth, has been transferred to Monument, N. M.

E. C. Broun, Jr., petroleum engineer for Humble Oil & Refining Co., has been transferred from Lovell Lake district to Thompsons, Tex., in the same capacity.

F. C. Sealey and **E. M. Butterworth** have been elected vice presidents of California Texas Oil Co., Ltd. Sealey

F. C. SEALEY

E. BUTTERWORTH

has been associated with the oil industry during his entire business career which began with The Texas Co. in 1917 as an assistant geologist. The past 13 years have been devoted to petroleum producing activities abroad, and since 1949 he has been in charge of producing and exploration for the Caltex-Bahrein group of companies with headquarters in New York. Butterworth graduated from University of California in 1916 and beginning in 1924 was active in the East Indies. For the past several years he has been directly concerned with government relations in Sumatra and New Guinea for the Caltex-Bahrein group.

Raymon Wingfield, geologist for Stanolind Oil & Gas Co., has been transferred from Lake Charles, La., to New Orleans.

H. J. Southwick has joined Ned Biffle Drilling Co. at Shawnee, Okla., as superintendent in charge of drilling and producing operations. He was formerly production manager for Williams-Copeland, Inc., at Tulsa, and prior to that had pioneered the Ringwood, Okla., field with Mazda Oil Corp. as production superintendent.

L. L. Tarne has been named northern division superintendent of the pipe-line department of General Petroleum Corp. **C. A. McDonald** has been appointed assistant division superintendent. Both men will headquarter at Taft, Calif. Tarne, who spent the first 20 of his 29 years with General Petroleum in the Lebec station on the Tehachapi pipe line, has been assistant superintendent of the southern division for the last 5 years.

PERSONALS

McDonald, who has been with the firm since 1938, has been safety supervisor.

J. Ward, III, senior petroleum engineer with Humble Oil & Refining Co., has been transferred from Houston to Tyler, Tex., and promoted to supervising petroleum engineer.

John R. Rider, production foreman for Amerada Petroleum Corp., has been transferred from Paradis, La., to Lubbock, Tex.

N. Dean Altemus, junior petroleum engineer for Stanolind Oil & Gas Co., has been transferred from Pampa to Lubbock, Tex.

Milton E. May, geologist for Atlantic Refining Co., has been transferred from Shawnee, Okla., to Houston.

George L. Herrell, geologist for Union Producing Co., has been transferred from Jackson, Miss., to Monroe, La.

Gerald E. Knowles has rejeined Richfield Oil Corp. as geologist at Elko, Nev., after receiving an M.S. degree in geology from Stanford University.

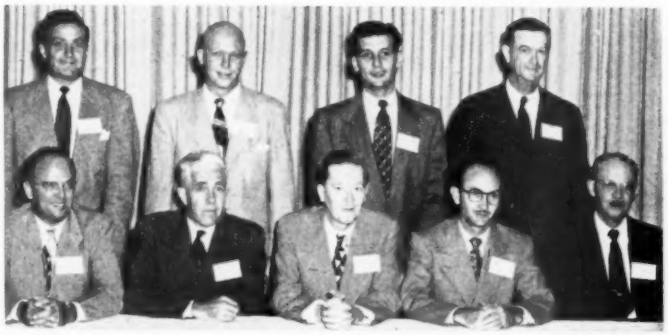
H. W. Yeargain, tool pusher for Trinity Drilling Co., at Odessa, Tex., has resigned and joined Den-Tex Oil Co. at Dallas in the same capacity.

Dan A. Bee, petroleum engineer trainee for Stanolind Oil & Gas Co., at Monahans, Tex., has been moved to Wink, Tex., and promoted to petroleum engineer.

David S. Stear, petroleum engineer trainee for The Texas Co. at Golden Meadow, La., has been transferred to Houma, La., and promoted to petroleum engineer.

Albert L. Carpenter, associate petroleum engineer for Humble Oil & Refining Co. at Thompsons, Tex., has been transferred to Midland, Tex., and promoted to petroleum engineer.

R. L. Wales, geophysical supervisor at Calgary, Alta., Canada, for The Texas Co., has been promoted to assistant division manager of the geophysical division of the producing department, and **R. N. Harding,** geophysical supervisor at Denver, has been promoted to assistant to division manager of the geophysical division. Wales joined the firm in 1934, entered the geophysical division in 1936, and was named geophysical supervisor in 1948. He will remain in Calgary. Harding succeeds **B. H. Troybig, Jr.,** who recently resigned, and will be located at Houston.



NEW OFFICIALS.—Officers and committee members elected at the annual meeting of the South Texas Geological Society of San Antonio held in Austin, are, front row, left to right: C. M. McDaniel, treasurer, Atlantic Oil & Refining Co.; James K. Rogers, vice president, Arkansas Fuel Oil Co.; John Sandidge, president, Magnolia Petroleum Co.; Lloyd Ryman, secretary, Continental Oil Co.; and Robert G. Kurtz, executive committeeman, Ohio Oil Co. Back row, left to right: Leavitt Corning, entertainment, Dunlap & Corning; Robert S. Mann, program, Thornton Davis; Thad R. Carpen, registration, Continental; and M. A. Harrell, program, independent. Absent when the picture was taken were Byron Rile, convention chairman, independent; and John T. Lonsdale, Austin arrangements, Bureau of Economic Geology, University of Texas.

Floyd B. Inks, Jr., recent petroleum engineering graduate of University of Texas, has joined Gulf Oil Corp. at Beaumont, Tex., as engineer trainee.

James K. Anderson, formerly independent operator at Gainesville, Tex., has joined Aztec Oil Co. at San Angelo, Tex., as geological engineer.

Jack E. Small, formerly geologist for Calvert Drilling, Inc., at Olney, Ill., has opened independent geological-consulting offices at Mount Carmel, Ill.

Floyd D. Sawyer, engineer trainee with Stanolind Oil & Gas Co. at Wink, Tex., has been transferred to Andrews, Tex., and promoted to junior petroleum engineer.

Richard B. Smith, petroleum engineer at Fort Worth for Continental Oil Co., has been transferred to Houston and advanced to production engineer.

Edward M. Fuerst, engineer trainee at Oklahoma City for British-American Oil Producing Co., has been named junior production engineer at Tulsa.

Bing Quai Yee, geologist for Carter Oil Co., has been transferred from Manhattan, Kans., to Oklahoma City in the same capacity.

John R. Bass, who for many years was associated with the J. S. Abercrombie Co. in the Old Ocean field, is president of the newly created J. R. B. Drilling Co. at Houston.

W. B. Gaston is vice president of the firm, and **Glenn Y. Davidson** is secretary and treasurer.

E. F. Battson, Houston, administrative vice president of Continental Oil Co., has been elected a director of the firm. **W. C. MacMillan,** senior vice president, has resigned as director due to ill health.

E. T. Robinson, Jr., formerly assistant pipe-line superintendent with offices in Shreveport for Texas Eastern Transmission Corp., has been transferred to Lebanon, Tenn., as manager of Division 5. **Earl Humble,** formerly assistant manager of Division 4 at Baytown, Tex., has been appointed assistant pipe-line superintendent with headquarters at Shreveport. **Dewey C. Henderson,** formerly measurement engineer, has been named assistant division manager at Baytown.

H. G. Bannerot, Jr., has been elected president and treasurer of Elk Refining Co., at Charleston, Pa., and **W. S. Zehrung** was elected vice president. The new elections will fill vacancies caused by the resignation of **H. A. Logan,** of Warren, Pa. A new and larger board of directors was chosen, including Bannerot, Zehrung, **Ralph D. Lowe,** who is vice president in charge of sales for Elk; **J. A. Bornmann,** who is secretary of the firm; **G. J. Hanks,** director and president of South Penn Oil Co.; and **G. A. Reid,** director and president of South Penn Natural Gas Co., and president of Triad Oil Co., and Eureka Pipe Line Co.

PERSONALS

John J. Winterbottom has been appointed coordinator, and **Loren F. Kahle** has been named deputy of the newly established office to coordinate world-wide transportation for Standard Oil Co. (N. J.), beginning operations January 1. Winterbottom joined Jersey Standard's marine department,

I. WINTERBOTTOM

L. F. KAHLE

now Esso Shipping Co., in 1916 as a traffic clerk. In 1930 he became assistant to the advisor of European affiliates, and in 1940 became manager of the traffic division. In 1942 he went to Aruba as marine manager of Lago Oil & Transport Co., Ltd., and in 1944 he was loaned to the war shipping administration in Washington as director of tankers. He returned to the marine department in 1945 as assistant general manager and became executive vice president of Esso Shipping in 1950, a position he will retain until January 1. Kahle joined Jersey Standard in 1924 and until 1941 he was engaged in pipe-line and production work in Mexico and Venezuela. After working with the Navy in World War II, he joined Carter Oil Co. in Tulsa as superintendent of petroleum transportation. In 1944 he became executive vice president of Interstate Oil Pipe Line Co., and was elected president in 1945. From 1949 until this summer when he became assistant to the pipe line advisor, he was executive vice president of Interprovincial Pipe Line Co. He will continue as assistant to the pipe line advisor until he takes his new post January 1.

Dr. W. E. Bradley, assistant to the vice president of Union Oil Co. of California, has been appointed manager of research at the new laboratories nearing completion at Brea, Calif. **Homer Reed,** formerly chief engineer for manufacturing, will be chief engineer in charge of engineering and development. Dr. Bradley appointed **J. E. Sherborne,** who has been assistant to the vice president, as assistant manager of research at Brea. Reed announced the following assignments: **Dr. Clyde Berge,** assistant to the vice president, to be manager of process development, with headquarters at the Los Angeles refinery; **Arnold Kelley** to be supervisor of manufacturing processes, with headquarters at the Los Angeles office; **Jack Tielrooy** to be supervisor of chemical processes, and **Paul Foreman** to be supervisor of process economics, both at Brea.

I. D. Hairrill, assistant field superintendent for Argo Oil Corp., has been transferred from Alice to Midland, Tex.

Danny E. Shupp, engineer for Carter Oil Co., has been transferred from Seminole, Okla., to Tulsa.

Donald A. Arnold, formerly petroleum-engineering student at University of Texas, has joined The Texas Co. at Calpet, Wyo., as engineer trainee.

Robert J. Ross, formerly geologist at Corpus Christi for Continental Oil Co., has joined Taylor Refining Co. at McAllen, Tex., in the same capacity.

Roy W. Johnson, formerly field engineer for Service Pipe Line Co. at Galesburg, Ill., has joined Standard Oil Co. (Ind.) as project engineer at Chicago.

Joseph J. Lawnick, exploitation engineer for Shell Oil Co., has been transferred from Lake Charles, La., to Odessa, Tex.

H. Preston Pew, construction engineer for Sun Oil Co. at Delhi, La., has been transferred to Silver, Tex., as superintendent of the Jameson natural-gas plant.

Harold Menke has been elected president of the newly established Kamco Oil Co. at McLeansboro, Ill. **E. E. Arterberry** will be secretary-treasurer, and **Rex Klump** is a member of the board of directors.

H. L. Ritter, independent oil operator at Olney, Ill., has moved his offices to Denver.

Denver Taylor, recent graduate from University of Michigan, has joined Continental Oil Co. at Evansville, Ind., as geologist.

Irving E. Miller, chemical engineer in the Standard Oil Co. (Ind.) research laboratory at Sugar Creek, Mo., has been promoted to group leader. He has been with the firm since 1944.

W. C. Wenzel, executive manager of the Pennsylvania Grade Crude Oil Association, left New York this week by plane for London, and will spend several weeks touring Europe visiting association members and surveying conditions affecting marketing of Pennsylvania oils.

Jim Penn, geologist for Gulf Refining Co., has been transferred from Evansville, Ind., to Tulsa; **Howard W. Lorenz,** geologist at Billings, Mont.; and **Bill Wilson,** geologist at Salt Lake City, have been transferred to Evansville.

Earl B. Noble, past president of the American Association of Petroleum Geologists, and formerly petroleum consultant to the National City Bank of New York, is now located at Houston as a consulting geologist. Prior to his association with the bank he had been with Union Oil Co. of California as chief geologist, manager of exploration, and general manager for Canada.

V. E. Long, formerly with Phillips Petroleum Co. at Houston, has joined Allis Oil Co. as general manager at Abbeville, La.

Douglas R. Keenan, Jr., geologist with Gulf Oil Corp., has resigned to join American Republics Corp., at Houston, as reserve geologist. He replaces **Ralph I. Ellsworth,** who has been transferred to the production department.

John W. Hendrickson has been appointed technical assistant to the superintendent of production and transmission for New York State Natural Gas Corp. He has been associated with the geological departments of New York State Natural and Peoples Natural Gas Co. for several years.

DEATHS

Thomas H. Duffy, 64, formerly with Union Oil Co. for 15 years, died October 20 in Long Beach, Calif.

Ben N. Youngken, retired sales manager of the California Division, National Supply Co., died at Los Angeles October 1.

Winfield C. Brower, 83, died October 22 in Westfield, N. J. He entered the petroleum industry in 1887 with Standard Oil Co. (N. Y.) and later engaged in refinery-construction work in Canada. He retired several years ago.

William J. Addems, 81, former foreman in the Bayway, N. J., refinery of Esso Standard Oil Co., died October 22 in St. Petersburg, Fla. Addems retired in 1933 after 42 years with Esso Standard.

Russell G. Lowe, 73, associate divisional attorney in the Tulsa Division of Gulf Oil Corp., died October 25 in Oklahoma City. He had been with Gulf for more than 20 years.

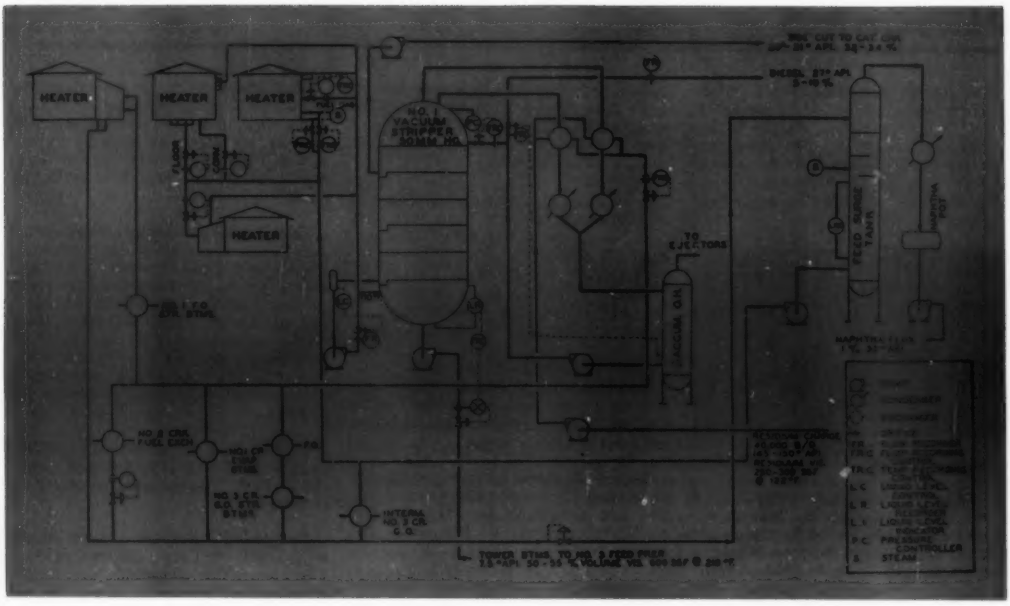


Fig. 1—No. 1 feed-preparation unit flow arrangement.

Tide Water Makes Process Improvements At Avon Catalytic Cracking Plant

Feed preparation, conversion sections carefully engineered to increase gasoline yield from heavy feed stock

A YIELD of 12,200 bbl. daily of gasoline fractions, including butanes, is obtained at the Tide Water Associated Oil Co., Avon, Calif., refinery from a total feed to the fluid catalytic cracking unit of about 25,000 bbl. per day.

This is an excellent yield in view of the heavy nature of the feed stock. The composite distillate charged to the cat cracker is so dark that no color reading can be obtained. It has a gravity of 21° A.P.I. and a viscosity at 200 S.s.U. at 100° F. High percentages of sulfur and nitrogen contribute to catalyst deposits and other operational problems.

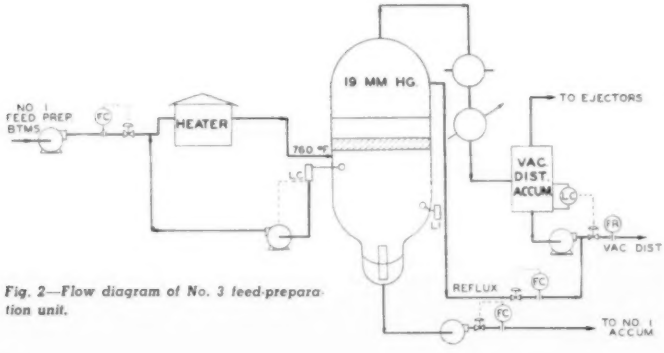


Fig. 2—Flow diagram of No. 3 feed-preparation unit.

Historically, Tide Water Associated operation of the U.O.P.-licensed fluid catalytic unit at Avon, began in the period of emergency during World War II. After V-J Day, there was an opportunity to experiment with the unit and to determine process limitations as governed by type and composition of feed to the unit.

Tide Water's supply of crude oil for refining operations on the West Coast is made up of various types, ranging from an extremely heavy, high-sulfur oil produced in Zaca Creek field in Santa Barbara County, to some of the lightest oils produced in California. All of the crude oil processed in the refinery at Avon, excepting the high-sulfur Zaca, contributes heavy distillate to make up feed to the catalytic cracking unit.

Process scheme.—Crude oil to the various units in the refinery is charged at a rate of approximately 68,000 bbl. per day. The topped crude is further processed by vacuum distillation to obtain the maximum yield of distillate, and a minimum of tars. These tars are processed by viscosity

breaking. Part of the vacuum distillate is refined into lubricating oils. The bulk of the vacuum distillate is charged to the catalytic cracking unit. Reduced crude from several units in the refinery supplies a 40,000-bbl. per day average charge to the Nos. 1 and 3 feed-preparation units from which most of the material for catalytic cracking is obtained.

Feed Preparation

The combination of topped crude and heavy "nongasoline" bearing crudes coming to the feed-preparation units has an average gravity of 14 -15° A.P.I. and a viscosity of 250-300 S.s.F. at 122° F. The two vacuum units are operated in series to strip this material of all possible distillate fractions. The feed stock is pumped to heat exchangers on overhead vapors from the No. 1 vacuum stripper and is further exchanged against bottoms from the thermal crackers before entering the first phase of vacuum distillation.

Sufficient heat is picked up in this manner to carry out primary flashing in a feed surge column from which approximately 1 per cent of the total feed to the vacuum units is recovered as a 35° A.P.I. naphtha. Bottoms from the feed surge tank are pumped directly to the gas-fired heaters operating in parallel to produce a transfer-line temperature of 710° F.

No. 1 vacuum stripper.—This vessel (Fig. 1) contains six bubble trays. The hot material from the heaters enters the column below the bottom tray. A circulating pump takes suction from the bottom tray, discharging back into the column. The stripper column is operated with a vacuum of 50 mm. Hg. to produce an overhead stream of diesel fuel amounting to approximately 9 per cent of charge and having a gravity of 27° A.P.I. This stream flows through exchangers, giving up heat to the vacuum stripper feed, and then through water-cooled units.

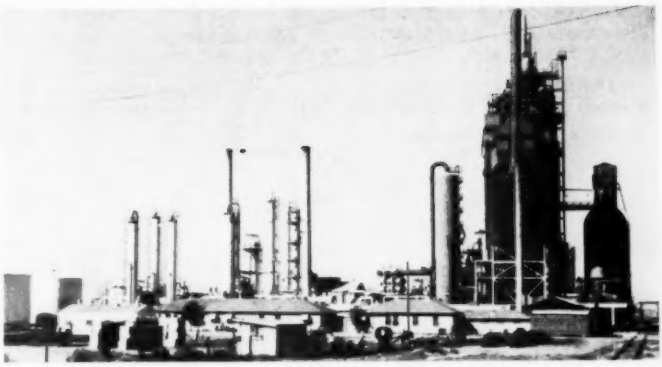


Fig. 3—High yields of gasoline are being obtained from the heavy distillate charged to this fluid catalytic cracking unit at the Tide Water Associated Avon, Calif., plant.

A hot side cut from the fifth tray, counted from the bottom, is removed as a 20 -21° A.P.I. distillate, which is approximately 35 per cent of the charge to the feed-preparation units. This cut is transferred directly to the catalytic cracking unit at an average temperature of 540° F. Bottoms from No. 1 unit are pumped directly to No. 3 feed-preparation unit. These bottoms amount to about 55 per cent of the original charge to the feed-preparation units. No. 1 tower bottoms have a gravity of 7.5° A.P.I., and a viscosity of 600 S.s.F. at 210° F.

No. 3 vacuum stripper.—This is a smaller column than the No. 1 feed-preparation unit but is operated at a higher temperature. This stripper contains one bubble tray near its top and a 4-in. "de-mister" pad just above the transfer-line feed nozzle (Fig. 2). The feed to No. 3 unit, approximately 22,000 bbl. per day, passes directly to a single gas-fired heater where the temperature is raised to 760° F. This hot, low-gravity stripped feed enters the column directly below the de-mister. A recycle pump takes suction on the material in the base of the column, returning it to the inlet of the gas-fired heater to maintain a high temperature in the tower and to promote stripping of the distillate. This column is operated at 19 mm. Hg. vacuum.

The overhead liquid product, amounting to 25-28 per cent of the 7.5° A.P.I. feed, has a gravity of 17° A.P.I., and a 50 per cent A.S.T.M. distillation point of around 950° F. This product is the heaviest portion of the catalytic cracking plant feed stock, is clean, and has an A.S.T.M. color of about eight. Bottoms, amounting to 72-75 per cent of the feed to No. 3 feed-preparation unit, have a gravity of 5.5° A.P.I., and a penetration of 11-14 at 77° F. This material is pumped directly to a two-coil thermal cracking unit, together with lube-still residuum and a small amount of cat-

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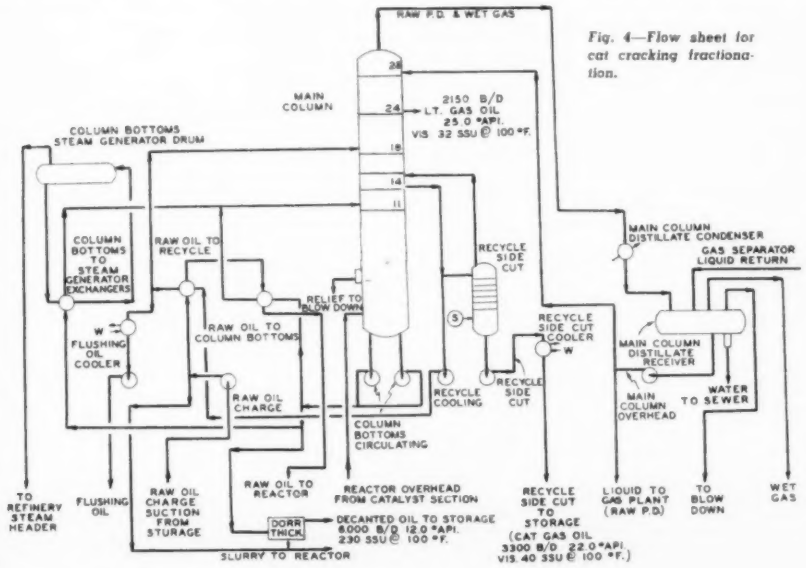

Fig. 4—Flow sheet for cat cracking fractionation.

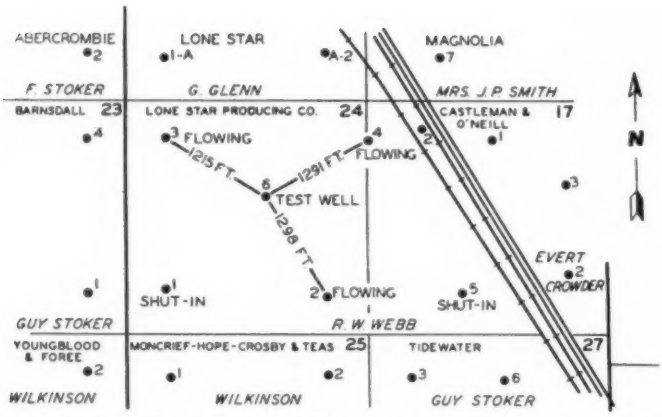

Fig. 1—Surface location of wells near 6 Webb, Kelly-Snyder area, Scurry county, Texas.

PRESSURE MAINTENANCE PLANNING.—The questions of (1) effective permeability, (2) pressure of channels, (3) reservoir interconnection, (4) suitable well completions, and (5) reservoir conditions, are important considerations in planning water or natural-gas injection programs.

The accompanying report describes a special field test which the U. S. Bureau of Mines has just completed in the big Canyon Reef field of Scurry County, Texas.

This report furnishes valuable information on the aforegoing factors for the Scurry field, and it may also be used as a "guide book" or case history by petroleum engineers studying these tests for use in planning other water or gas-injection programs.

Pressure-Buildup and Well-Interference Tests

On Lone Star Producing Co. 6 Webb, Scurry County, Texas

by R. V. Smith,* R. H. Williams,* E. J. Dewees,* and F. G. Archer*

PRESSURE buildup and interference tests were conducted on a well of Lone Star Producing Co. in the Kelly-Snyder area, Scurry County, Texas, to determine the effective permeability of the Reef reservoir and the suitability of the reservoir for pressure maintenance by the injection of gas or water.

The operator, in an effort to increase the recovery of oil, has installed facilities for an experimental gas-injection project and has designated a well for gas injection. Accordingly, the well in which gas was to be injected was selected for the tests.

Data presented in this report indicate that reservoir conditions in this particular area are favorable toward the success of pressure-maintenance programs by the injection of either gas or water.

The pressure-measuring techniques used were those developed by Bureau of Mines engineers,[1,2] and the methods of analyzing the pressure-buildup data were those developed by Miller, Dyes, and Hutchinson.[3]

Results and Conclusions

The field tests gave results and indicated conclusions as follows:

1. **Effective permeability.**—The reservoir formation in the drainage area of the 6 Webb well was 8.2 or 10.8 md., depending on use of the perforation interval or net productive thickness estimated from a MicroLog.

2. **No channels.**—A slow continuous pressure increase over a period of 5 days indicated that no highly permeable channels exist between the 6 Webb well and offset wells.

3. **Reservoir interconnection.**—A pressure decrease at the end of the test period indicated that the reservoir within the area tested is interconnected.

4. **Good well completion.** — The over-all permeability, including the effect on permeability of well-completion procedure, is approximately the same as reservoir permeability, indicating that the well completion was adequate.

5. **Reservoir conditions.**—Indicated to be favorable toward gas or water injection as a means of increasing oil recovery in the particular area of the 6 Webb well.

Test Well and Offset Wells

The R. W. Webb lease, owned by Lone Star Producing Co., is in Tract 24, Section 17, Block 1, of the J. P. Smith Survey of Scurry County, Texas. The lease was developed during 1950 by the drilling and completion of six wells that produce oil from the Canyon formation in the Kelly-Snyder area of the Scurry Reef. The surface locations of the Webb lease wells and direct offset wells are shown in Fig. 1.

The 6 Webb well was drilled to a total depth of 6,831 ft. (—4,460 ft. subsea) and completed with 7-in. casing set on the bottom of the hole. The casing was perforated with 532 shots between depths of 6,652 and 6,817 ft., an interval of 165 ft. The well was treated with 500 gal. of acid. Examination of the MicroLog showed an estimated total permeable section of 128 ft. opposite productive zones. The offset wells were completed in a similar manner.

Test Procedure

In order not to exceed the allowable oil production from the lease, the 1 and 5 Webb wells were shut in throughout the test period, which included the time that well No. 6 was flowed to obtain a steady-state distribution of pressure and the time that well No. 6 was shut in. Wells Nos. 2, 3, and 4 were produced at a steady rate of approximately 108 bbl. each per day for the entire test period. The 6 Webb well, before testing, was producing at the normal allowable rate. The producing rate was increased 17 days before the shut-in period, when a 16/64-in. choke was installed. The choke was changed to a 17/64-in. and a 19/64-in. at 15 and 10 days before the shut-in period, respectively.

Immediately before the shut-in period, the producing rate of the 6 Webb well was determined to be 337.2 stock-tank barrels of 42.6° A.P.I. oil per day. Also, before the shut-in period subsurface pressures and temperatures were measured at successive depths down to 6,800 ft. in the flowing well. While the subsurface pressure and temperature gages were at a depth of 6,800 ft. (about 10 ft. above the tubing perforations) the well was closed in at the well head. Subsurface pressures were taken at a depth of 6,800 ft. at suitable intervals throughout the shut-in period (Fig. 2).

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Pressure and Temperature Measurements

In the measurement of subsurface pressures and temperatures, a pressure and a temperature gage were run in the well together as a unit. No pressure measurements were made without a corresponding temperature measurement. Deflections of the gages were recorded on polished aluminum foil with "Permopivot" phonograph needles that made lines less than 0.001 in. in width. Deflections on the charts were measured with a comparator microscope and converted to corresponding pressures by the methods published by Smith and Dewees[1] and Smith, Dewees, and Williams.[2]

In addition to the techniques and corrections described in these papers, special calibrations were made to correct for the "drift" of the Amerada-type pressure gage when subjected to high pressures over long periods.*

Computation of Results

Examination of the pressure plotted against the logarithm of time in minutes, shown in Fig. 2, reveals four distinct but related sets of conditions in the relationship between pressure and time. Immediately after the well was shut in, the first part of the pressure buildup curve was influenced by continued flow of oil into the well bore. The second phase is the straight-line portion of the curve on Fig. 2 and shows the effect of the permeability of the producing formation surrounding the test well on the rate of pressure buildup. After the second relationship between pressure and time, the pressure continued to increase for several days until a fourth phase began with a gradual decrease in pressure in the reservoir.

Effective permeability. — According to Miller, Dyes, and Hutchinson,[3] the straight-line section of the pressure-buildup curve may be used with their method to estimate the effective permeability of the producing formation to the flowing fluid provided the straight-line part of the curve falls between the T limits of 0.01 and 0.1, where T is a dimensionless variable proportional to time as defined by Equation 2. The flowing fluid of the 6 Webb well was single-phase (liquid) oil, as the pressures observed were above the saturation pressure and the well did not produce water.

The effective permeability of the formation may be calculated from the slope of the straight-line section of the pressure-buildup curve by the following relation:

$$k = \frac{162.5\ Q \mu F}{mh} \qquad (1)$$

where:

- k = effective permeability to oil, md.
- Q = production rate prior to shut in, bbl. of stock-tank oil per day
- μ = oil viscosity, cp.
- F = formation volume factor, bbl. of reservoir oil per bbl. of stock-tank oil
- m = slope of straight-line section of curve
- h = effective productive formation thickness, ft.

The slope of the straight-line section of the curve (Fig. 2) is:

$$m = \frac{2{,}077.9 - 2{,}052.8}{1.00} = 25.1$$

The flow rate Q was determined to be 337.2 bbl. per day. From information published by Keplinger and Wanenmacher,[4] viscosity μ and formation volume factor F were estimated to be 0.40 cp. and 1.56, respectively. Permeability-feet may be computed as follows:

$$kh = \frac{162.5 \times 337.2 \times 0.40 \times 1.56}{25.1}$$

$$= 1{,}360 \text{ md.-ft.}$$

If the net productive thickness of 126 ft., estimated from the MicroLog, is used, then:

$$k = \frac{1{,}360}{126} = 10.8 \text{ md.}$$

or, if the perforation interval of 165 ft. is used, then:

$$k = \frac{1{,}360}{165} = 8.2 \text{ md.}$$

The T interval may be computed for single-phase flow by the following:

$$T = \frac{0.0002637\ k\ t}{f\ c\ \mu\ r_e^2} \qquad (2)$$

where:

- T = dimensionless variable proportional to time
- k = permeability, md. (from Equation 1)
- t = time, hours
- f = total porosity, fraction
- c = mean liquid compressibility, psi.$^{-1}$
- r_e = radius of drainage, ft.

Taking permeability as 8.2 md., time at the end of the straight-line section as 8.73 hours, porosity as 0.08, compressibility as 13.7×10^{-6}, and viscosity as 0.40 cp., and considering the relative rate of flow, the radius of drainage under the test conditions assumed to be three-fourths the distance to the nearest well or 900 ft., T at the end of the straight-line section is:

$$T = \frac{0.0002637 \times 8.2 \times 8.73}{0.08 \times 13.7 \times 10^{-6} \times 0.40 \times (900)^2}$$

$$= 0.053$$

Using the same constants, T at the beginning of the straight-line section at t = 2.38 hours is:

$$T = 0.015$$

Thus, the straight section of the buildup curve shown on Fig. 2 meets the requirements of Miller, Dyes, and Hutchinson, which are that it falls in the T interval of 0.01 and 0.1. Therefore, the permeability is considered to be representative of the producing formation around the 6 Webb well.

Although the remainder of the pressure-buildup curve from 9 hours to approximately 5 days is irregular, possibly from errors in pressure measurement,* the pressure gradually increased throughout this time interval. As the three offset wells, Nos. 2, 3, and 4, were flowing during this time interval, the increase in pressure indicates that there are no highly permeable zones connecting

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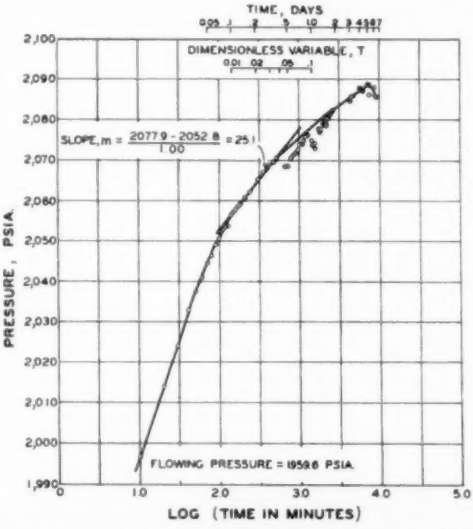

Fig. 2—Pressures measured at 6,800 ft. during pressure buildup and interference tests, 6 Webb, Kelly-Snyder area.

*Calibration of the subsurface pressure gage showed a slight "drift" (increased deflection) in the pressure reading as a result of continued exposure to high pressure. The pressure-buildup curve was corrected for drift but the corrections did not entirely eliminate the irregularities.

Here's how to get

by J. U. Teague*

More Service From Drilling Lines

This paper discusses rotary drilling lines and how to get more service out of them. Many operators and contractors are reducing their drilling-line costs, and there is no reason why other contractors cannot do equally well. What they are doing is simple and easy, requiring mainly:

1. Current and accurate service records on each line, preferably at the rig where the line is in use.

2. Longer lines and cutting off short lengths at regular intervals.

3. Large-diameter lines.

4. Care in handling and using wire lines as recommended by the American Petroleum Institute, and wire-lines manufacturers.

WIRE line costs have increased, as have all other supplies used by the drilling contractors, in recent years. In 1945 a $1\frac{1}{8}$-in. line cost about 59 cents per foot; today it costs 67 cents, an increase of about 14 per cent. The trend toward deeper drilling has also increased wire-line costs. A round trip from 5,000 ft. deep with $4\frac{1}{2}$-in. drill pipe, 120 ft. of $6\frac{1}{2}$-in. o.d. drill collars, and a traveling block and hook weighing 14,000 lb., accumulates 67 ton-miles of wire-line service. A round trip from 10,000 ft. deep with the same equipment accumulates 190 ton-miles; and from 15,000 ft., 369 ton-miles. So, 35 round trips from 10,000 ft. would accumulate as much wire-line service as 100 round trips from 5,000 ft. It is especially important then, that the contractor engaged in deep drilling pay attention to his wire line costs.

Service Record

The most important prerequisite to good wire-line service is a good service record. Most contractors keep some sort of ton-mile records on their drilling lines. If you are like most, the ton-mile service obtained from a line is computed after the line has been replaced. This is probably done by going back through the daily drilling reports when you have a little spare time, counting the round trips made while the particular line was in service, then consulting the ton-mile chart and arriving at a figure which represents the the total service. If it seems too low, you make a mental note to demand an adjustment from the wire-line manufacturer's representative or else threaten to quit using his particular line. This type of record keeping is probably better than none at all, but it won't do if you want to get the maximum service from your line. To do that, the ton-mile service record on a line must be kept daily as the line is used. You will see why this is so further along in this discussion.

It is preferable to keep the service record on the line at the rig where the tool pusher can consult it daily. Various wire-line manufacturers are providing simple charts and calculators with which the average tool pusher or driller can easily calculate the ton-mile service on the line he is using.

Ton-mile service does not reflect wear due to shock loads or other damage to the line by unusual conditions. Such damage might occur in very rough drilling, chasing drill pipe to unplug a bit, jarring while fishing, or heavy pulls made on stuck pipe. It is important that the tool pusher include, in his service record, notations of such operations. This will enable him properly to evaluate the service rendered by a drilling line.

Long Drilling Lines

It has been well demonstrated that better wire-line service is obtained by using lines long enough to string the maximum number of lines which will be required to drill the well and have enough excess to permit worn sections to be cut off drum from time to time. In the past, a line 2,500 ft. long seemed to be the popular length for deep drilling. This has now been increased to 3,500 ft. and even to 5,000 ft. in some cases on deep wells in West Texas.

Even a haphazard program of cutting off worn sections of line from the drum seems to improve the service, but very great increases in service have been realized when a definite cutting-off program has been followed. The best results have been obtained by cutting off a section each time the line accumulates a certain number of ton-miles service. This is why it is important to keep the service record of the line at the rig.

The amount of service which can be allowed between cuts is something the operator will have to determine by trial and error. There are so many variables on each individual rig, which affect wire-line service, that a fixed recommendation cannot be made. The amount of line cut off should be such that points of concentrated wear will be changed. The worst wear occurs where the line turns back from the end of a wrap to start another wrap on the drum. Abnormal wear also occurs at the top of the crown-block sheaves and the bottom of the traveling-block sheaves at the points where loads are regularly picked up.

If enough line is pulled through to put the turn-back point of one wrap at exactly the turn-back point of a lower wrap, or a pickup point on one sheave exactly at the pickup point of another, then certainly no benefit will result from cutting off a section. It will be simple to avoid this if the tool pusher understands what he is doing. The field engineers of the wire-line manufacturers will be glad to help the contractor work out a program of cutting off line for his particular rigs.

The best practice seems to be to make short cuts of around 35 to 60 ft. at frequent intervals rather than longer cuts at longer intervals. One manufacturer who has been working with contractors using long lines on deep drilling recommends a cut of 30 to 60 ft. at intervals of 800 to 1,200 ton-miles of service. Another manufacturer who has given a great deal of study to this, has developed a simple chart to help select the proper length to cut off.

The use of a long line and frequent cutoffs is fine for increasing wire-line service but there are other factors which must be considered before you go all out on such a program. It will not benefit the contractor to double the life of his line if he spends more in rig downtime cutting off the line, or in extra costs due to hauling and handling the extra length of line, than

*President, Columbia Drilling Co. Presented at eleventh annual meeting, American Association of Oilwell Drilling Contractors, Fort Worth.

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the value of the line saved. For example, on barge rigs, the use of very long lines would present no transportation or handling problem, whereas on a rig which is moved every 3 weeks or so, transportation and handling might be a prohibitive factor. If the rig were dismantled each time it was moved, the length of line used would probably be limited by the capacity of the drawworks drum. All these factors must be weighed in arriving at the most beneficial program from an over-all cost standpoint.

The time required to cut off the line can be reduced to a minimum by a study of the problem on the individual rig. Some contractors have provided means for hanging the block in the derrick instead of setting it down on the floor when pulling the line off the drum and through the sheaves to make a cut. Others recommend use of a grooved drum which will permit use of fewer wraps on the drum when the traveling block is in its lowered position, resulting in less line to be unspooled from the drum before the line is cut off. There are also patented dead-line anchors which will permit faster release of the line than the U-bolt wire-line clamps ordinarily used. These anchors offer a further advantage in that they will not injure the line when it is clamped off like the U-bolt clamps will.

An outstanding example of how wire-line service can be increased is illustrated by a line installed on a barge rig by a major company. This line was carefully watched by both the manufacturer and the company. A rigid program of inspection was maintained and a cut off program of 15 to 35 ft. after each 2,000 ton-miles of service was followed. The service record of this line was:

Depth of wells: 14,000 ft.
Area: South Louisiana.
Line: 1½ in. by 3,500 ft., 6 by 19 improved plow steel, right-lay, independent wire-rope center, preformed rope.
Derrick: 184 ft. high.
Number of lines: Ten.
Final length of line: 2,306 ft.
Total service: 95,000 ton-miles.

This line ran a full year. A sample was taken from the worst part of the section cut off after 69,000 ton-miles of service and it was found that the loss in tensile strength was only 4.2 per cent. A final sample, taken when the line was discarded, showed a decrease of 38 per cent of tensile strength. There were no outer wires broken on the first sample but on the final sample there were a number of the outer wires broken. This is significant in that not only was the ton-miles service on the line increased but a line of virtually full strength was maintained until the very last.

This is a phenomenal record, an average of 27 ton-miles per foot of rope. Records available on eleven 1⅛ in., thirty 1¼ in., and thirteen 1⅜ in. lines indicated an average of 4.4, 5.5, and 6.4 ton-miles per foot of line, respectively. These lines were cut off at irregular intervals on the basis of visual inspection on all of the 1⅛ in. and 1⅜-in. lines. Only 4 per cent of the 1¼-in. lines were cut off on the basis of ton-mile service. This comparison illustrates how service can be increased if definite program of care is followed.

One major company reported that they were increasing their ton-mile service by using larger-diameter lines. Where they had been accustomed to using 1¼-in. lines, by changing to 1⅜-in. lines, they reduced the cost per ton-mile of wire line service by one-half. They have realized better service from the larger-diameter lines even when a definite cut off program was not followed. This company is still experimenting with this idea and, if it is found to be valid, the probable result will be a trend toward using larger lines, as well as a definite cutoff program for maximum service.

Discarding Lines

When is a line worn out and ready for replacement? The visual inspections given the line by the tool pusher or driller is probably as accurate as any. When he notices the outside wires on the line begin to break, the line will deteriorate very rapidly under further service. So, on that point, at least, we do not have to resort to the "scientific method."

The preformed line has to be watched closer than the nonpreformed line, for the wires on preformed lines will break and remain in position, whereas on the nonpreformed line the wire will usually spring out or "wicker" as soon as it breaks. The tool pusher or driller inspecting the line should not mistake flattening or "peening" of the outside wires for badly worn wires. It is possible to flatten the outer wires due to working under heavy loads without actually reducing the cross-sectional area of the steel or seriously impairing the strength of the line. If the line is inspected closely, it is possible to distinguish between the line on which the outer wires have been worn and one which is merely flattened from so-called peening.

Rig personnel should be cautioned to inspect preformed and nonpreformed lines very closely for broken wires when they approach the discard point. If they don't, the contractor may find himself with his drill pipe on bottom with a line so bad he doesn't dare pull out of the hole without changing it.

Choosing a Line

The contractor has a wide choice of sizes, types, and construction of wire lines available to him to fit his particular needs. It has long been the custom to choose a new line which will give a safety factor of five when the heaviest expected load is applied with the maximum number of lines strung.

The size of the line and the grade of steel it is made from determine its strength. The average strengths of the lines most commonly used in rotary drilling are:

AVERAGE STRENGTH

Line size (in.)	Plow steel Hemp center (lb.)	Improved plow steel Hemp center (lb.)	Improved plow steel Wire rope center (lb.)
¾	41,400	47,600	51,200
1	72,800	83,600	90,000
1⅛	91,400	105,200	113,200
1¼	112,400	129,200	139,000
1⅜	135,000	155,400	167,000

These strengths are for lines of 6 by 19 construction but they are approximately correct for other type construction such as 6 by 21.

The construction of a line determines its resistance to abrasive wear and its flexibility. The fewer number of wires, the more resistance the line has to abrasive wear and the less flexible it is. The more wires used in the construction of the line, the less resistant to abrasion it is and the more flexible. A 6 by 7 line would be highly resistant to abrasion but not very flexible. A 6 by 45 line would not stand abrasion but would be very flexible. The 6 by 19 line has seemed to be a happy medium for oil-field rotary-drilling lines and is nearly universally used, except on small rigs.

It is obvious that the least flexible line would be the most easily damaged by bending stresses and would require larger drum and sheave diameters for proper use. Excessive bending stresses will cause a line to fatigue and fail in a short while. An example of this, I'm sure most of you can remember, is breaking a piece of bailing wire. You made a short bend in the wire and reversed it back and forth rapidly. The wire broke. If you had made a long bend in the wire and reversed it back and forth, it would have been difficult to break. A similar thing occurs when you run a line over a sheave or around a drum that is too small.

The recommended sheave diameters for different rope construction are:

6 by 7, 42 times rope diameter.
6 by 19, 30 times rope diameter.
6 by 37, 18 times rope diameter.

The hemp-center line is a cheaper line than one with an independent wire—rope center. It is also more flexible and has the ability to cushion shocks imparted by sudden starts and stops. It does not have the ability to resist crushing like a line with the independent wire-rope center. If the line to be used needs maximum strength for its size, and will be subjected to high compressive loads, the independent wire - rope - center line should be used.

The use of preformed or nonpreformed lines is a matter of choice

(Continued on page 74)

A plant...

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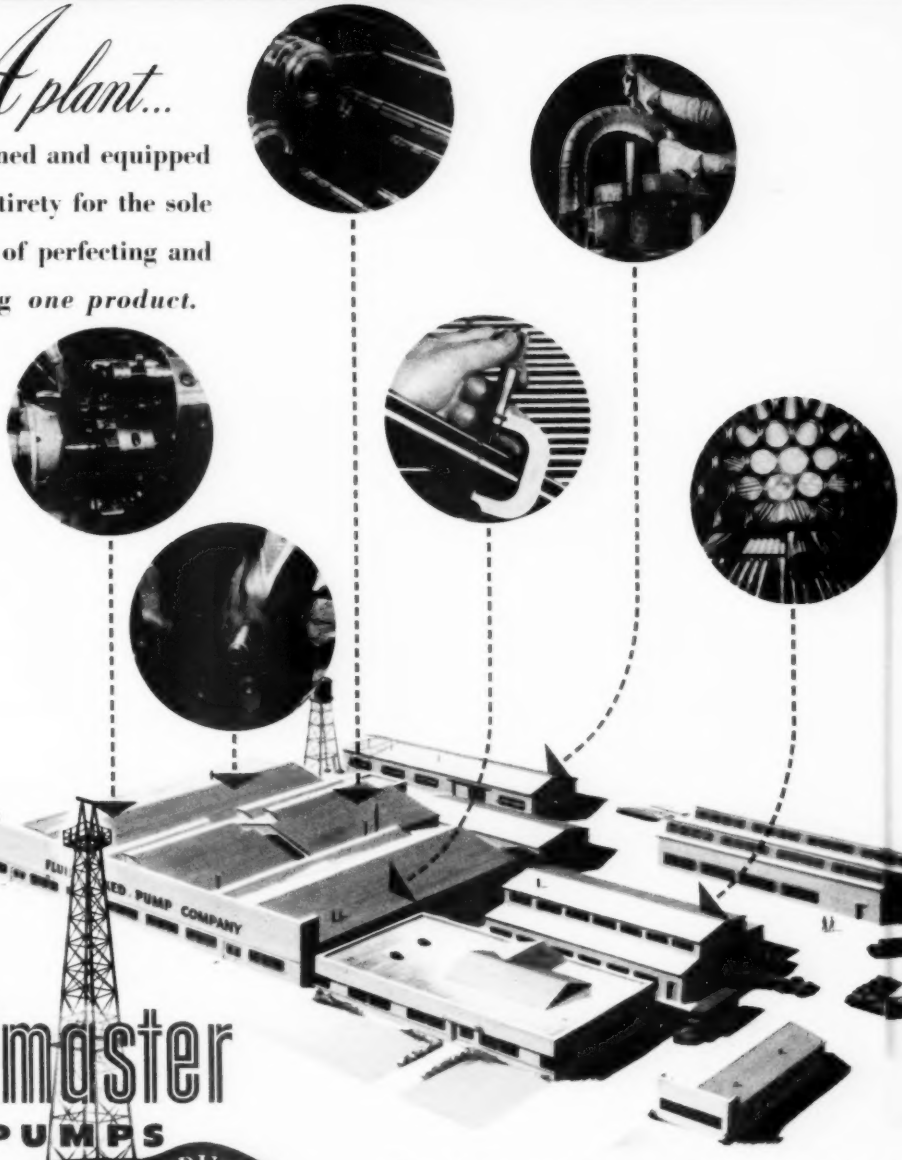

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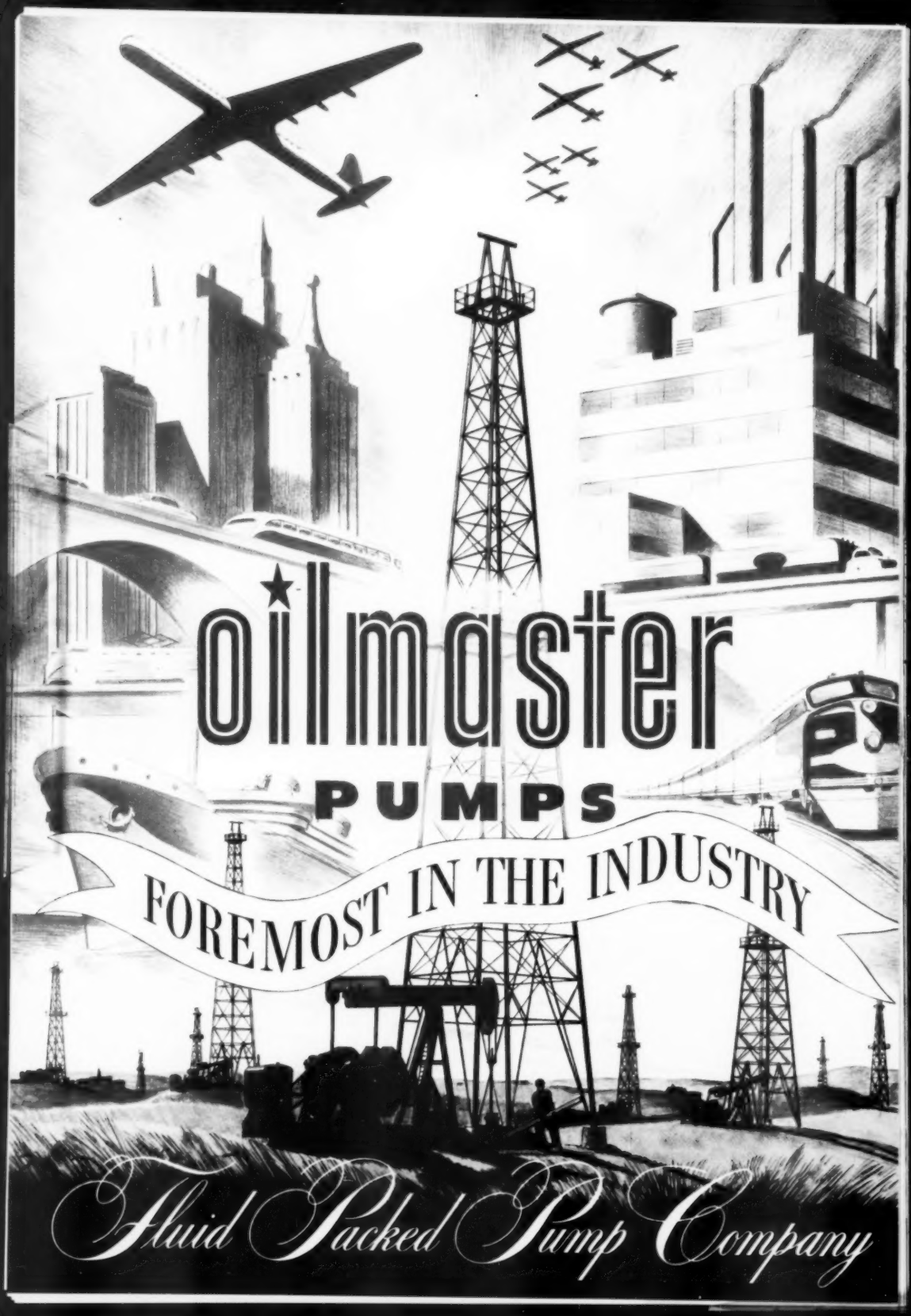
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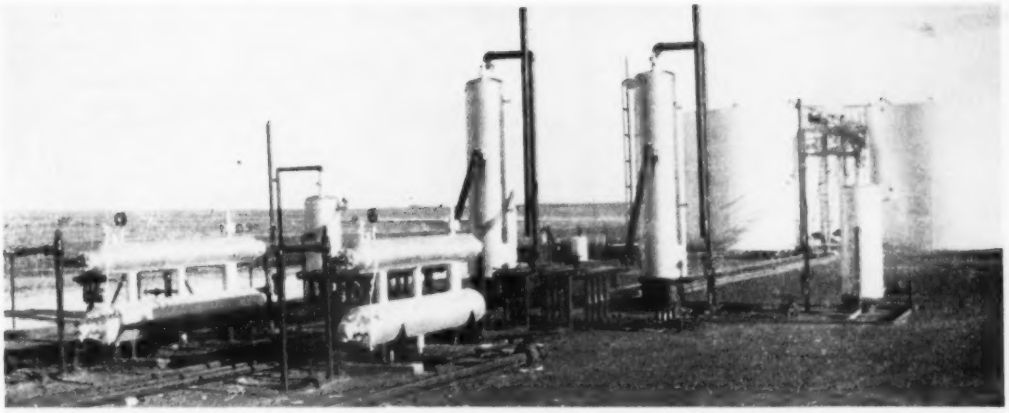


Over-all view of separation system showing one of the three-way manifolds between high and low-pressure separators.

All Piping Placed Aboveground In New Phillips Tank Batteries

by Roy F. Carlson
West Texas District Editor

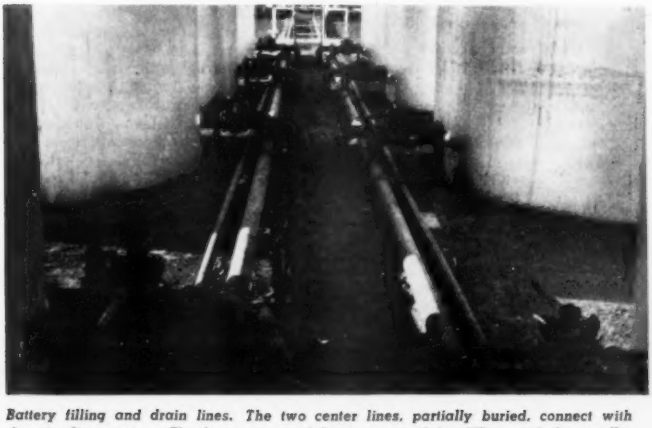
A TANK-BATTERY construction plan recently adopted by several districts of Phillips Petroleum Co. calls for placing of all piping aboveground. Header connections, tank drain and fill lines, and pipe-line connections are on or above the surface of the ground. This new plan has been followed in construction of batteries on Phillips' leases in Scurry County and other areas of West Texas.

The accompanying photographs illustrate simplification in battery piping, one of the design purposes. With all the lines above the ground, a new pumper on a lease can trace out the flow pattern to the tankage easier than following a drawing. All of the flow system is exposed so that well and tank swifching and equalizing valves are readily accessible, headers or manifolds for controlling well flow are out in the open, and drain and rolling lines can be easily followed.

Another reason for adopting this kind of piping system is to eliminate corrosion which occurs in many areas when pipe is laid below ground surface. Very often, at least in West Texas, pipe will deteriorate rapidly because of surface corrosion, and leaks around a tank battery are particularly hazardous.

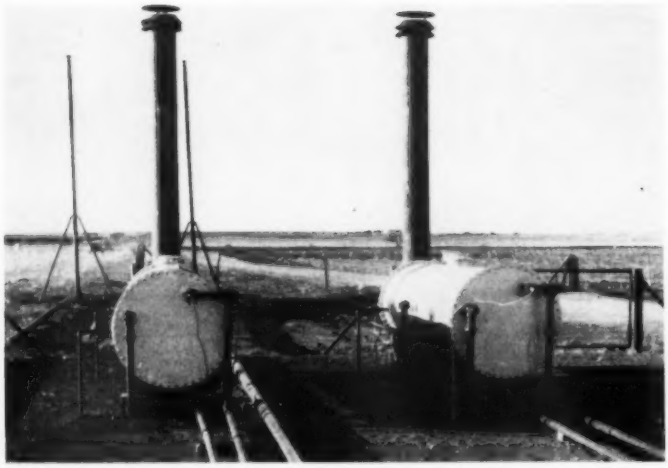
Where leaks or breaks of any kind occur, they are immediately obvious with the pipe and connections above the ground. If pipe is buried a large volume of ground may become oil-soaked before the leak is noticed, creating a fire hazard and a maintenance problem. In addition to the leaks being immediately seen, the pipe is accessible at the surface for easy repair.

In a very dry atmosphere such as is prevalent in West Texas there is little need to consider rusting of the pipe if the lines are given a protective coating. Foundation problems are simple since there are no ditches



Battery filling and drain lines. The two center lines, partially buried, connect with the pipe-line system. The larger exposed lines are used for filling and the smaller lines for testing.

The line shown here, connecting with one bank of tanks in the battery, drains to the burn pit. A 2-in. line supplies gas for rolling.



These two heaters, employed in the separation operation, are rated for 1,000 psi. working pressure. The units are single-pass indirect fired.

to dig and fill. The lines shown in the accompanying photographs, taken at a Phillips Scurry County battery, are laid on concrete blocks, just high enough to keep the pipe off the ground. Of course with all connections exposed, it is essential that joints be made up carefully, and all connection work accurately made because bad connections and crooked joints cannot be covered up in a ditch.

These new batteries are modern in other respects, too, because of the complete connection system and the flexibility of the batteries. Lines from the wells are manifolded together in three-way headers. One header connection is for normal flowing in a two-stage separation system. Another connection is for a test separation and filling system, and the other is for low or second-stage separation in the event well pressure connecting into that portion of the header should fall below the high pressure in the first separation stage. The regular fill line is 4 in., the test lines are 2 in.

Another 2-in. line is tied from the separators into the drain-line side of the tanks, for gas rolling the contents of any of the tanks in the event treating of stored oil becomes necessary.

A two-stage separation system is provided for efficient extraction of gas from the oil. High-pressure separators are horizontal, low-pressure separators are vertical. An individual separator is installed for testing of individual wells. This separator is fitted with a separate line so that production from the tested well can be turned into a separate tank.

The drain system from the tanks to the burn pit is fitted at each tank with a removable plug so that when draining water from the tanks it is easy to see when water flow is replaced by oil.

The flow line system is unusual too, in that all chokes for regulating well flow are placed in the lines just ahead of the manifold, so that relatively high pressures and temperatures are maintained on the flow lines. This is done to reduce paraffin deposition in the flow lines. A bull-plug trap placed in the flow system at the separators serves to catch paraffin-scraping balls that are placed in the lines at the well head.

Tide Water Makes Process Improvements

(Continued from page 51)

alytic gas oil. This operation yields about 18 per cent pressure distillate and a cracked fuel which requires only 29 per cent cutter stock to reduce it to a viscosity at 100 S.s.F. at 122° F.

Catalytic Cracking

The feed to the fluid catalytic cracking unit (Fig. 3) consists of distillate produced in the two feed-preparation units, together with fractions from the lube-oil operation and miscellaneous gas oil obtained elsewhere in the refinery. The total charge is about 25,000 bbl. daily. The composite mixture has an A.P.I. gravity of 21.5°, a viscosity of 200 S.s.U. at 100° F., carbon residue of about 0.25 per cent, and a "K" factor of 11.5. The material is so dark that no color reading can be obtained. It contains sulfur compounds to the extent of about 1 per cent, and nitrogen averages around 0.31 per cent.

Catalyst.—Experimental runs were made with different catalysts aiming at maximum conversion of the composite feed stock described above. A mixture of 20 per cent of microspheroidal synthetic and 80 per cent of a newly developed sulfur-resistant natural catalyst was the most favorable mixture from a standpoint of economics and product distribution.

Process improvements.—Flow through the fluid catalytic cracking unit is similar to other plants of this design. A number of process improvements have been made resulting in increased gasoline production. In 1948 an internal cellular stripper was installed in the reactor, which improved product distribution by reducing the coke yields from 8 per cent to around 6.5 per cent at 55 per cent conversion. (These are weight per cents based on the feed stock.) Simultaneously coke-burning capacity was increased by raising the regenerator pressure. The two-stage regenerator cyclones installed in 1950 further increased coke-burning ability, to about 23,000 lb. per hour.

Cat fractionator.—Vapors from the reactor enter near the bottom of the catalytic fractionator (Fig. 4). A portion of the column bottoms is recycled back into the vessel, entering on the eleventh tray. A side cut of catalytic gas oil is taken off the fourteenth tray. This cut amounts to about 3,300 bbl. per day of material having an A.P.I. gravity of 22° and viscosity of 40 S.s.U. at 100° F. Bottoms are pumped through a Dorr thickener to separate slurry from the liquid. The decanted liquid amounts to about 6,000 bbl. per day of 12° A.P.I. material having a viscosity of 230 S.s.U. at 100° F. The separated slurry is returned to the catalytic cracker, entering the reactor with the fresh feed. Wet gas and pressure distillate coming off overhead flow through water-serviced condensers and coolers. In addition to these overhead products, a light gas-oil side cut is taken from the column near the top. This has an approximate volume of 2,100 bbl. per day with an A.P.I. gravity of 25°, and a viscosity of 32 S.s.U. at 100° F.

Gas plant.—Wet gas from the overhead accumulator is picked up by compressors and discharged, along with the raw gasoline, into a 24-tray absorber operating as a water-wash tower. The partial removal of ammonia, hydrogen sulfide, and cyanides at this point minimizes hydrogen corrosion. A combination absorber-demethanizer processes vapors separated from the pressure distillate to extract all gasoline and lighter materials. Residue from the demethanizer amounts to about 14,000,000 standard cubic feet per day and is consumed in the refinery as fuel.

Subsequent fractionation produces gasoline fractions, including butanes, totaling approximately 12,200 bbl. daily. This is an excellent yield considering the heavy nature of the feed stock, and the high percentage of nitrogen and other compounds contributing to catalyst deposits and other operational problems.

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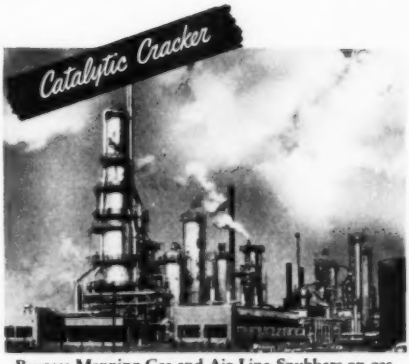
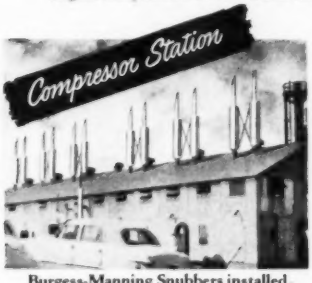
Our consultation and design services in the field of compressible fluid surge control will help you to reduce plant shutdowns due to equipment failure, reduce costly maintenance, and aid you in maintaining the operation of your plant at rated capacity. We invite your inquiries.



Burgess-Manning Gas and Air Line Snubbers on gas engine compressors of this Texas refinery.



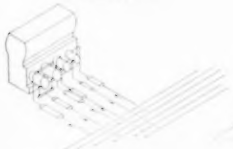
Burgess-Manning Snubbers installed on compressors at this large Oklahoma Compressor Station.

Burgess-Manning Gas and Air Line Snubbers installed on compressors at a natural gasoline plant.

Burgess-Manning Gas and Air Line Snubbers installed ahead of meter runs at a Wyoming recycling plant.

THE BASIC PROBLEMS

Vibration



Burgess-Manning Gas and Air Line Snubbers eliminate, reduce, or prevent vibration in all lines due to the intermittent suction or discharge of compressors, blowers, or pumps. They also protect associated equipment from mechanical failures due to excessive gas surge.

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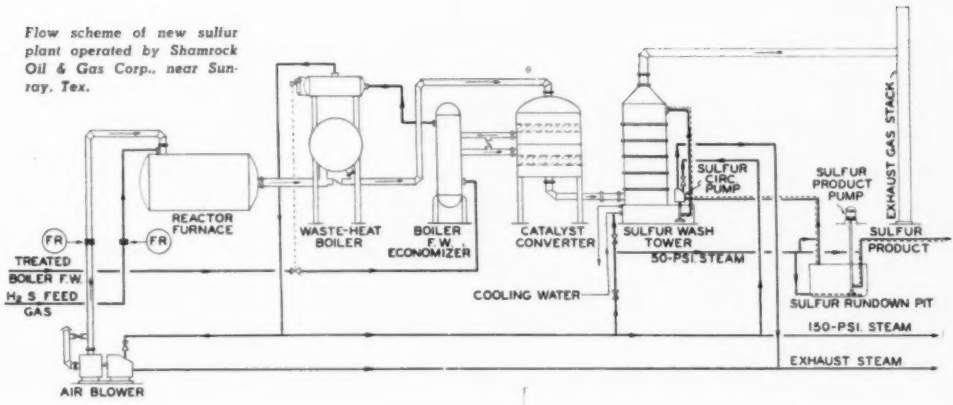


Flow scheme of new sulfur plant operated by Shamrock Oil & Gas Corp., near Sunray, Tex.

Shamrock Recovers 30 Tons of Sulfur Daily at McKee Plant

by D. H. Stormont
West Coast District Editor

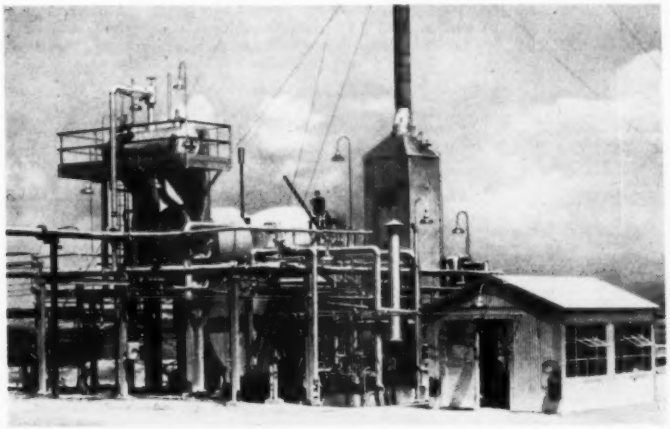
Sulfur plant operates in conjunction with Girbotol gas-treating unit. Operation is completely automatic

AT Shamrock Oil & Gas Corp.'s McKee plants in Moore County, near Sunray, Tex., acid gases which formerly were regarded as waste today are yielding 30 tons of elemental sulfur daily. Thus not only is the new unit eliminating a nuisance which could result from the flaring of the hydrogen sulfide gases, but also in the small way is helping to combat the present sulfur shortage.

The McKee plants consist of a modern refinery, rated at 10,000 bbl. daily crude-oil input and a natural-gasoline plant. Both sour and sweet natural gas is processed in the gasoline plant with the sour-gas residue being ultimately processed in the new sulfur plant.

Completely automatic, and almost entirely self-sufficient insofar as power requirements are concerned, the new sulfur plant operates in conjunction with a Girbotol gas-treating unit. The latter daily processes 340,000 M.c.f. of residue gas from the natural-gasoline plant and a relatively small volume of refinery vapors, employing an aqueous solution of monoethanolamine as the absorption agent. Exit gases from the Girbotol regeneration still then are fed to the new sulfur plant.

These feed gases total about 1,900 M.c.f. daily, and on an average have the following percentage concentrations: hydrogen sulfide, 43; carbon dioxide, 55.5; and light hydrocarbons, 1.5 per cent. They enter the sulfur plant at about 100° F. and at a pressure of 3 psig.



General view of the new plant which processes sour gas to yield 30 tons of elemental sulfur daily.

Plant Operation

Flow through the sulfur-recovery plant is illustrated in the accompanying simplified flow diagram. As shown. The first step consists of burning the feed gas in a specially designed reactor furnace. Flue gases from this furnace are partially cooled in a waste-heat boiler and then run to a catalyst converter. After passing through the first stage of the converter, the gases are run to a boiler feed-water economizer and then back through the second stage of the converter.

Final step is to pass the gases into a wash tower where they are cooled and make-sulfur is condensed by direct contact with a recirculated stream of liquid sulfur. Exit gases from the tower, vented to the atmosphere, are primarily nitrogen, carbon dioxide, and water vapor.

(Continued on page 74)

(Left) Midwestern Geophysical Co. shot-hole drill in McCone County, Montana, about 25 miles west of Shell Oil Co.'s Richey area strike. (Right) Surveyor's truck kicks up some dust in a roadless area of McCone County.

REPORT ON

Geophysical Exploration in Williston Basin

Number of seismograph crews in area increased in a few months from a handful to more than three score

by E. J. Handley

THE present exploration boom in the Williston basin exceeds in intensity any previous boom in the history of the oil industry insofar as the rate at which geophysical exploration work has accelerated since its inception is concerned.

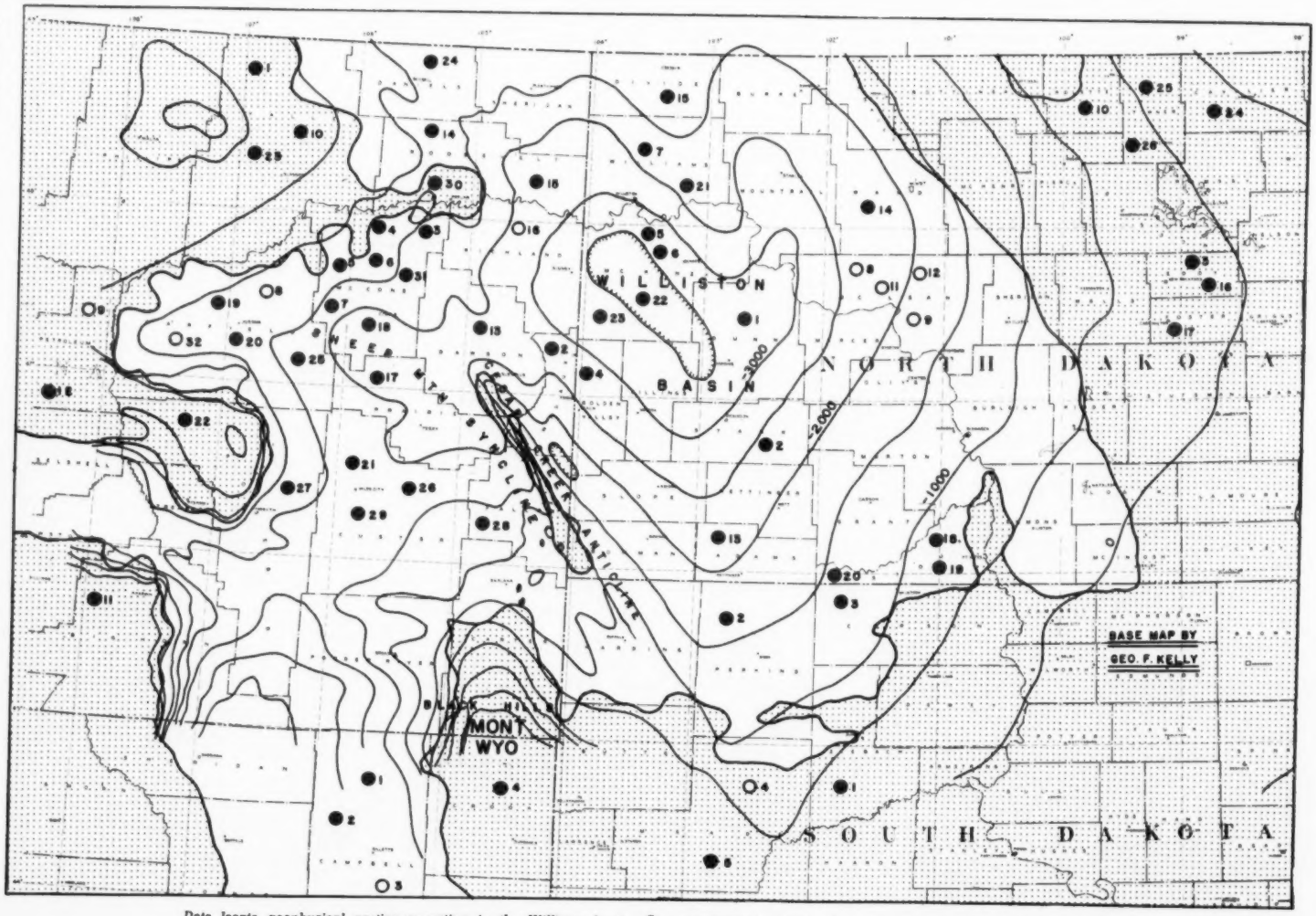
The Williston basin boom has followed the Denver - Julesburg basin boom, which in turn followed the Alberta basin boom.

There is a very simple and fundamental reason for the nature of these booms and why exploration activity develops in such cycles. That reason is competition.

The Williston basin activity actually evolved from the Alberta basin play, with the Denver-Julesburg basin activity interrupting the development. The presence of oil in basins such as the Alberta basin, the Denver-Julesburg basin, or the Williston basin extension of the larger Alberta basin, has been predicted for years by most competent geologists. When, however, a discovery occurs such as that of Imperial Oil, Ltd., in Leduc field in Alberta, other operators are encouraged to move rather quickly into the picture to obtain a representative share of acreage.

The rapidity with which this acreage has to be evaluated depends upon various factors. It would appear that the primary factor in the Alberta basin was governmental regulations regarding geological and geophysical reservations. After Ohio Oil Co. made its significant discoveries in the Denver basin, which were substantiated by Shell Oil Co. and British-American Producing Co., other operators were led to accelerate their activity—

Example of a good seismogram made in the eastern Montana portion of the Williston basin by Midwestern. Reflections near right-hand end of record are believed to be near the top of the Mississippian-Madison.



Dots locate geophysical parties operating in the Williston basin. See accompanying table for companies operating these parties.

THE AUTHOR

Ernest Jack Handley is vice president and director of Century Geophysical Corp., Tulsa, in charge of field operations. He graduated from University of Oklahoma in 1933, and carried on graduate work there the next year. He worked for Continental Oil Co. as seismograph party chief until 1943; then as geophysicist for British-American Oil Producing Co. (1945); with Shell Oil Co., Inc., as seismograph supervisor (to 1946), before going with Century as an original incorporator.

the factor here being that acreage was relatively cheap and that it was advisable to accumulate this acreage as quickly as possible before the price had advanced appreciably.

Potentialities of the Area

The Williston basin can be considered as a southeast extension of the Alberta basin and is probably entirely underlain by rocks of Devonian age. Production from rocks of this age is probably more widely distributed geographically throughout the world than from any of the other geological ages. In every basin where Devonian has been found to be present it has been found to be productive.

With Amerada Petroleum Corp.'s discovery well in North Dakota proving the presence of Devonian rocks and their productivity, which was rather quickly followed by Shell's discovery in eastern Montana, other companies found it advisable to accelerate their exploration efforts.

One factor leading to the rush for leases, in addition to the comparatively low cost of acreage in the area, has been the existence of relatively large, short-term-option blocks held in a few firm hands, notably, railroad companies.

The tremendous importance of Amerada's discovery was based not on the production from the well but upon its geological significance. When the subsequent Montana discovery indicated the productive potentialities of the Mississippian, it was apparent that exploration efforts should be accelerated. Although production from the Devonian rocks in the basin should ultimately be much greater than from the Mississippian rocks, the shallower depths to the latter added explosive fuel to the fire.

Following these strikes acreage was obtained as rapidly as possible by practically all major oil companies and seismograph crews were pushed into the area with almost frantic dispatch. The number of seismograph crews in the area increased from a handful in a few months to about 67 by the end of September 1951.

General Nature of the Basin

The north rim of the basin is covered by glacial drift with the southern border being rather strikingly outlined by the Missouri River.

North of the river the terrain consists of treeless plains and grassy lands of steeply rolling hills with

(Continued on page 76)

MAJOR OIL COMPANIES NOW OPERATING IN WILLISTON BASIN

The schedule below and the accompanying map indicate the scope of geophysical operations in the basin, identifying the major oil companies doing the work and roughly locating geographically their respective areas of interest. Such a schedule necessarily cannot be entirely accurate because of incompleteness originally, and because of the withdrawal or addition of crews since its compilation.

MONTANA

Company—	Crew	Area by county	No.
Amerada Petroleum Corp.	Company—seis.	Valley	1
Amerada Petroleum Corp.	S.E.C.—seis.	Wibaux	2
Amerada Petroleum Corp.	Company—seis.	McCone	3
Amerada Petroleum Corp.	Midwestern—seis.	McCone	4
Amerada Petroleum Corp.	Oil Exploration—seis.	McCone	5
Amerada Petroleum Corp.	Dayton—seis.	McCone	6
The California Co.	G.S.I.—seis.	McCone	7
The California Co.	G.S.I.—gravity	Garfield	8
The California Co.	G.S.I.—gravity	Petroleum	9
Carter Oil Co.	Company—seis.	Valley	10
Cities Service Oil Co.*	Petty—seis.	Big Horn	11
Cities Service Oil Co.*	Winfrey—seis.	Petroleum	12
Continental Oil Co.	Petty—seis.	Dawson	13
Deep Rock Oil Corp.	Southern Geo.—seis.	Roosevelt	14
Gulf Oil Corp.	Company—seis.	Roosevelt	15
Gulf Oil Corp.	Company—gravity	Richland	16
Lion Oil Co.	McCollum—seis.	Prairie	17
Shell Oil Co.	Company—seis.	McCone	18
Shell Oil Co.	Petty—seis.	Garfield	19
Shell Oil Co.	United—seis.	Garfield	20
Shell Oil Co.	Company—seis.	Custer	21
Shell Oil Co.	Ray-Flex—seis.	Rosebud	22
Stanolind Oil & Gas Co.	Company—seis.	Valley	23
Stanolind Oil & Gas Co.	G.S.I.—seis.	Daniels	24
Stanolind Oil & Gas Co.	Midwestern—seis.	Garfield	25
Sohio Oil Co.	Nance—seis.	Custer	26
The Texas Co.	Company—seis.	Rosebud	27
The Texas Co.	I.X.C.—seis:	Fallon	28
The Texas Co.	Tomlin—seis.	Custer	29
Union Oil Co. of California	United—seis.	Roosevelt	30
Union Oil Co. of California	United—seis.	McCone	31
(?)	Inter. Mt.—gravity	Garfield	32

*Recently withdrawn. Total—gravity 4, seis. 28.

NORTH DAKOTA

Company—	Crew	Area by county	No.
Atlantic Refining Co.	Company—seis.	Dunn	1
Cities Service Oil Co.*	Petty—seis.	Stark	2
Continental Oil Co.	Geo. Tech.—seis.	Eddy	3
Continental Oil Co.	Petty—seis.	Golden Valley	4
Deep Rock Oil Corp.	Dayton—seis.	McKenzie	5
Gulf Oil Corp.	Company—seis.	McKenzie	6
Gulf Oil Corp.	G.S.I.—seis.	Williams	7
Gulf Oil Corp.	Company—gravity	McLean	8
Lion Oil Co.	Robt. Ray—gravity	McLean	9
Lion Oil Co.	Petty—seis.	Rolette	10
Magnolia Petroleum Co.	Company—gravity	McLean	11
Magnolia Petroleum Co.	Company—gravity	McLean	12
Magnolia Petroleum Co.	Company—seis.	Adams	13
Phillips Petroleum Co.	Pet. Cons.—seis.	Ward	14
Pure Oil Co.	Geo. Tech.—seis.	Divide	15
Pure Oil Co.	Geo. Tech.—seis.	Eddy	16
Pure Oil Co.	Geo. Tech.—seis.	Foster	17
Shell Oil Co.	Petty—seis.	Sioux	18
Shell Oil Co.	Geo. Tech.—seis.	Sioux	19
Stanolind Oil & Gas Co.	Robt. Ray—seis.	Sioux	20
Stanolind Oil & Gas Co.	A.E.C.—seis.	Williams	21
Sun Oil Co.	Company—seis.	McKenzie	22
Sun Oil Co.	Portable—seis.	McKenzie	23
Union Oil Co. of California	United—seis.	Cavalier	24
Union Oil Co. of California	Geo. Tech.—seis.	Towner	25
Union Oil Co. of California	United—seis.	(?)	26

*Recently withdrawn. Total—gravity 4, seis. 22.

SOUTH DAKOTA

Company—	Crew	Area by county	No.
Kerr-McGee Oil Co.	Company—seis.	Ziebach	1
Magnolia Petroleum Co.	Company—seis.	Perkins	2
Shell Oil Co.	Petty—seis.	Corson	3
Shell Oil Co.	Petty—gravity	Meade	4
Shell Oil Co.	Geoseis—seis.	Meade	5

Total—gravity 1, seis. 4.

WYOMING

Company—	Crew	Area by county	No.
Gulf Oil Corp.	Company—seis.	Campbell	1
Pure Oil Co.	Petty—seis.	Campbell	2
Pure Oil Co.	Mayes-Bevans—gravity	Campbell	3
The Texas Co.	I.X.C.—seis.	Crook	4

Total—gravity 1, seis. 3.

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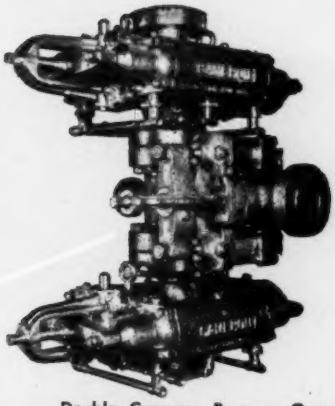

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Cameron Mud Line Pressure Gauge

Cameron Shear-Relief Valve

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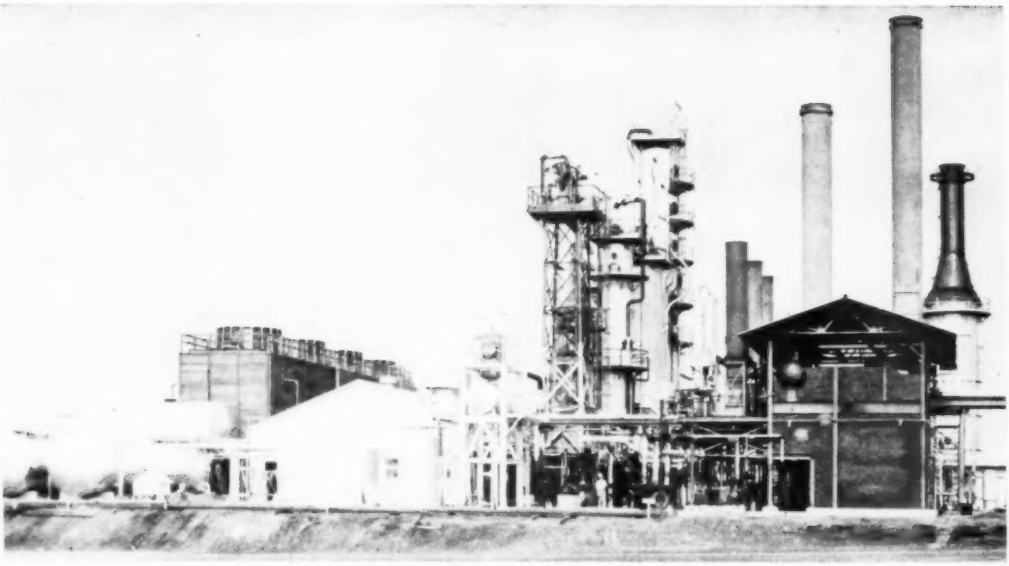


Erection of a new crude-distillation unit was a first step in McMurrey Refining Co.'s expansion.

Fuels Manufacture at McMurrey Refinery

. . . employs new cat cracker revamped thermal unit . . .

by John C. Reidel
Mid-Continent District Editor

Cat cracker gas-concentration plant.

McMURREY REFINING CO.'s modernization and expansion of its Tyler, Tex., plant began in the postwar period with the erection of a 10,000-bbl. per day crude-distillation unit, a new steam plant, research and development laboratory, and general office building. Continuing its modernization program, McMurrey recently placed on stream a catalytic cracking unit and revamped its existing thermal cracking facilities. Specifically the program included:

1. Installation of a U.O.P. fluid catalytic cracking unit designed for charging of distillates from the visbreaking of 26.6° A.P.I. East Texas reduced crude.

2. Revamping of part of the existing thermal cracking plant to a feed preparation unit consisting of a coil-only visbreaker with vacuum flashing of the flash-chamber bottoms.

3. Revamping of the remainder of the existing two-coil thermal cracking unit into a single-coil thermal unit operated on cat cracker cycle oil plus straightrun naphtha.

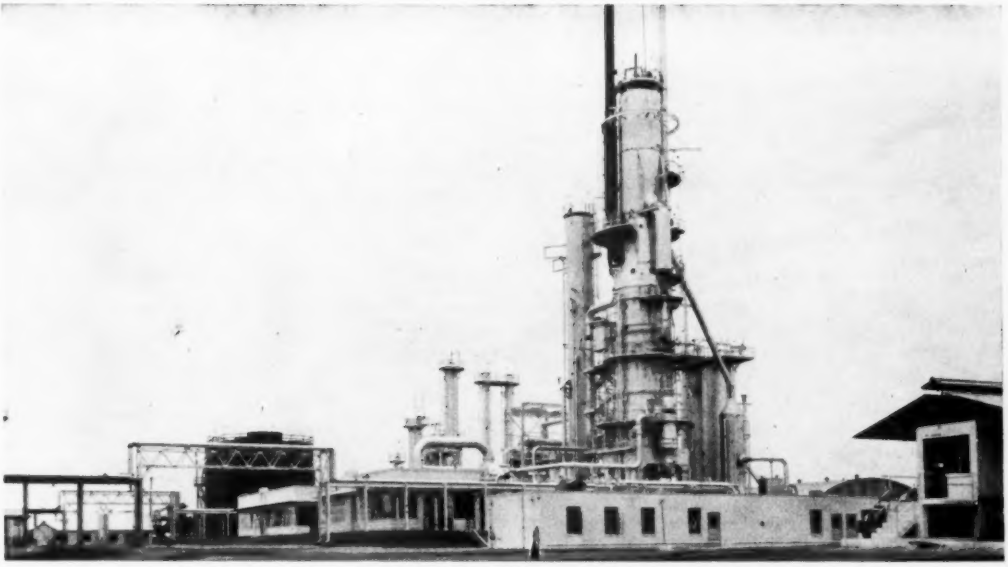
4. Installation of cat cracker gas-concentration unit.

5. Installation of a new U.O.P. polymerization plant consisting of two catalyst towers, a poly depropanizer, and a poly debutanizer.

Tie in of existing equipment with the new catalytic cracking and polymerization facilities is indicated in the accompanying diagram. A new cooling tower, circulating 7,000 g.p.m. of water, was also erected. Engineering and construction were by Refinery Engineering Co. of Tulsa. Basic design was furnished by Universal Oil Products Co.

Feed preparation. — Topped crude charge is passed through the visbreaker coil. This is followed by two-stage flashing utilizing the flash chamber and the reaction chamber of the old thermal cracking plant. Gas, distillate, and gas oil are obtained overhead from the atmospheric flash while bottoms are vacuum flashed in the reaction chamber to obtain light and heavy vacuum gas oil and asphalt residuum.

Catalytic cracking.—Combined distillates from the visbreaking-vacuum flash operation, amounting to 4,100 bbl. per day, constitute the raw-oil charge to the single-vessel-type catalytic cracking unit which em-



The new F.C.C. unit is shown here with control and compressor buildings in foreground.

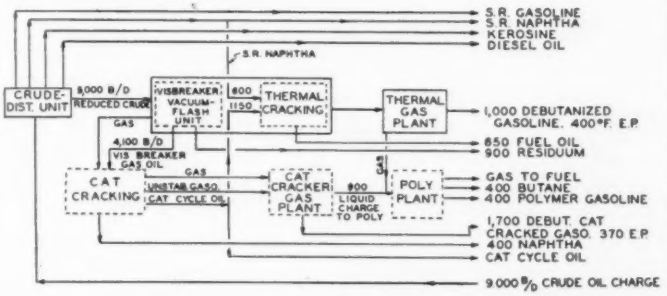
ploys Si-Al microspheroidal catalyst.

The gas recovery plant for cat cracking and visbreaking units consists of new equipment in the form of a primary and secondary absorber and a cat cracker debutanizer. Cat cracker gases are absorbed at 75 psi. using catalytic 4-lb.-R.v.p. receiver liquid and debutanizer cat cracked gasoline as primary absorption oil. Light recycle catalytic sidecut from the F.C.C. fractionator acts as sponge oil in the secondary absorber.

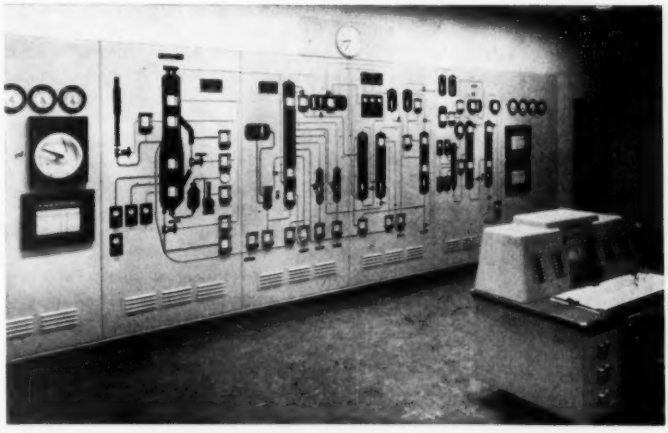
Thermal cracking.—Cat cracker cycle oil in the amount of 1,200 bbl. per day plus 600 bbl. daily of straight-run naphtha is charged to the single-coil thermal cracking section revamped from the original two-coil furnace. In the cracking operation cracked material obtained on the combined cycle oil-naphtha feed leaves the heater at 1,000° F. and 300 psig. Original absorption and distillation equipment is utilized in the thermal gas plant. This consists of fractionating column with flash zone, absorber using recycle oil as absorption medium, a stabilizer, and a rerun tower.

Poly plant.—Liquid charge to the poly plant is caustic washed and charged to the multibed chamber-type reactor. The operation in this section of the McMurrey refinery is a nonselective polymerization at 500 psi. and 400°-450° F. of liquid propane-propylene and butane-butylene fractions from Dubbs and F.C.C. debutanizer overhead streams. The poly plant fractionation system is designed to produce 10-lb.-R.v.p. polymer gasoline, spent B-B, and propane and lighter as gas to fuel.

Over-design rates.—While complete



Block flow diagram showing tie-in of old and new facilities.



Graphic-type panelboard in cat cracker control room.

information on performance is not available at this time, Tables 1 to 4 inclusive summarize the design data for the various units. Actual operation of the new facilities by McMurrey personnel at rates over those specified in the design may be noted by reference to the block flow diagram.

TABLE 1—VISBREAKER AND VACUUM FLASH UNIT

Est. yields:	°A.P.I.	BPSD	Lb./ hr.	Vol. (%)	Wt. (%)
Reduced crude charge	26.6	3,650	47,800	100.0	100.0
Gas			660		1.4
Distillate	48	455	5,200	12.5	10.9
Gas oil	30	2,340	29,800	64.1	62.4
Light vacuum gas oil	30	40	500	1.1	1.0
Heavy vacuum gas oil	21	365	4,840	10.0	10.1
Pitch	6.5	450	6,800	12.3	14.2

Instrumentation. — The old instrument system at the McMurrey plant involved the use of mechanical-type, direct-connected flow meters and pressure gages. There were many manual control stations and locally mounted controllers. This system was replaced by a completely new one employing pneumatic transmission so that no hydrocarbon lines enter the control rooms. Aluminum tubing is used for the instrument air lines.

The cat cracker, cat cracker fractionator and gas-recovery plant, and the poly plant instrumentation are set on a six-panel graphic-type instrument board, shown in photo. Instruments for the other units are placed on a conventional instrument board housed in a separate control room. Note in the photo of panel, the intercom unit on the desk to the right. Through the intercom system the operator in the cat cracker control room can communicate with the other control room as well as with various stations throughout the refinery.

Note also the single-record miniature recorders, of which 41 may be counted on the graphic-type instrument board. These have the advantage of quick, easy reading, eliminating the confusion that may result in reading multirecord instruments. At the same time considerable saving in panel-board space is obtained. The miniature recorders replace a conventional pneumatic recorder and an indicating control station which might otherwise be used on the board.

For flow measurement and control, mercuryless pneumatic-flow transmitters with blind, locally mounted controllers are used at the McMurrey refinery. Blind electronic temperature transmitters are employed and both force balance and displacement-type level instruments. Pressure and temperature controllers are blind and mounted on the back of the panel.

TABLE 2—FLUID CATALYTIC CRACKING UNIT

Combined feed ratio, by volume	1.41
Catalyst-to-oil ratio, on raw oil	18.1
on combined feed	12.7
Wt. hours space velocity, on raw oil	1.15
on combined feed	1.65
Conversion, vol. per cent gas-oil disappearance	71.7

Est. yields:	°A.P.I.	BPSD	Lb./ hr.	Vol. (%)	Wt. (%)
Charge to unit		3,830	48,500	100.0	100.0
Hydrogen sulfide			100		0.2
Hydrogen			145		0.3
Methane			680		1.4
Ethylene			290		0.6
Ethane			535		1.1
Propylene		190	1,450	5.0	3.0
Propane		125	920	3.2	1.9
Butylenes		235	2,050	6.1	4.3
Butanes		320	2,720	8.4	5.6
Gasoline, debutanized, 350° F. e.p.	63	1,555	16,480	40.6	33.9
Naphtha, 350/400° F.	40	375	4,500	9.8	9.3
Light cycle oil	28.5	780	10,150	20.4	20.9
Heavy cycle oil	24.0	300	4,020	7.9	8.3
Coke			4,460		9.2

Gas Recovery Unit

(Catalytic Cracking and Visbreaking)

Product summary—	
Debutanized gasoline, 7.4-lb. R.v.p., B/D	1,565
Liquid to poly unit, B/D	755
Lean absorber gas (720 B.t.u./cu. ft. gross H.V.), MMscf./D	1.85
C_3 recovery, per cent	60.0

TABLE 3—THERMAL CRACKING

Combined feed ratio, by volume	3.83 on cycle oil charge				
Est. yields:	°A.P.I.	BPSD	Lb./ hr.	Vol. (%)	Wt. (%)
Cat cycle oil	27.0	1,080	14,170		
Naphtha	47.7	460	5,300		
Total feed to unit		1,540	19,470	100.0	100.0
Hydrogen			15		0.1
Methane			575		3.0
Ethylene			60		0.3
Ethane			515		2.6
Propylene		37	280	2.4	1.4
Propane		97	730	6.3	3.8
Butylenes		40	350	2.6	1.8
Butanes		51	435	3.3	2.2
Gasoline, debutanized, 400° F. e.p.	51	790	9,015	51.3	46.3
Residuum	—2	467	7,495	30.4	38.5

TABLE 4—POLYMERIZATION UNIT

Fresh charge (after testing):	
Rate, B/SD (total)	944
from Dubbs	169
from F.C.C. unit	775
Propylene, mol per cent	15.5
Butylenes, mol per cent	27.8
Total higher olefins, mol per cent	43.3
Recycle:	
Rate, B/SD	654
Higher olefins, mol per cent	7.3
Combined feed:	
Rate, B/SD	1,598
Propylene, mol per cent	12.0
Butylenes, mol per cent	16.0
Total higher olefins, mol per cent	28.0
Products:	
Motor polymer, 10 lb. R.v.p., B/SD	315
Spent B-B, B/SD	360
Gas to fuel, SCF/D	316,000

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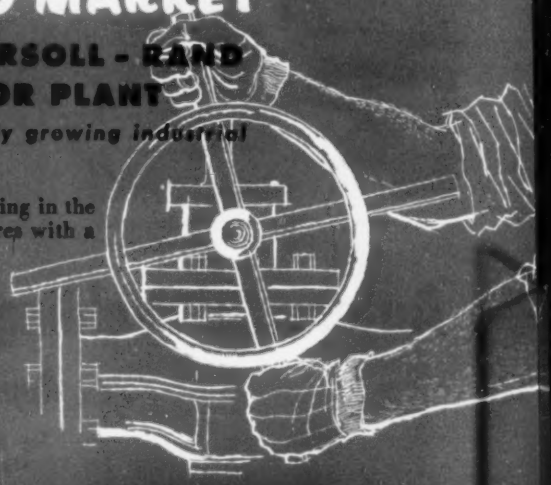

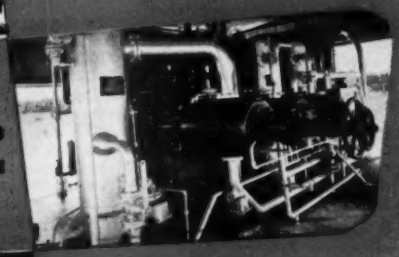

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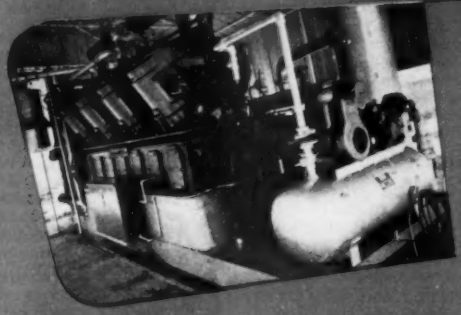

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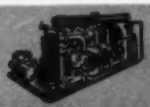

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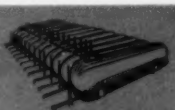

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In yard operations, the automatic welding operations double jointed 20-ft. joints to form 40-ft. joints.

On the right-of-way, the same automatic welding unit made these 40-ft. joints into 80-ft. joints.

Automatic Welding on the Right-of-Way

. . . Applied on Service Pipe Line Project

by Paul Reed
Pipe-Line Editor

THE possibilities of applying automatic welding to double jointing on the right-of-way offer the most promising means for reducing pipe-laying costs. Methods for automatic submerged arc welding itself have been standardized. But the procedures for appropriate handling of pipe and equipment for conducting automatic welding on the right-of-way have been in a process of evolution.

The methods for this purpose developed by O. R. Smith are exemplified in the work in progress during the past month for Service Pipe Line Co.

The project consists of laying 57 miles of 10-in. (11/32-in.-wall) reconditioned pipe from Salt Fork of Brazos River in Throckmorton County to Jud in Haskell County, Texas, 15 miles northwest of Haskell station. The job has been contracted by Smith Contracting Corp.

Since the pipe came to the job in 20-ft. joints from salvaging operations in Nebraska, the automatic welding was applied in the first 3 weeks in the Haskell yard for double jointing 33 miles of the pipe to form 40-ft. random lengths. After the yard double jointing was completed, the automatic welding equipment and accessories were moved to the right-of-way. This consists of welding 40-ft. joints for double jointing to make 80-ft. joints.

Flexibility of operation is gained by having the automatic welding unit suspended by cable from a tractor boom while it is being moved from one weld to another and while it is placed on the pipe.

Manual stringer-bead welding precedes automatic welding in the manner which is customary for such operations in the present stage of development of double jointing by automatic welding in this country. On the Service project the pipe was aligned preparatory for welding the initial root bead applied manually and for a second pass, also manually applied prior to application of automatic submerged arc welding. Pipe was torch beveled. Consequently, the second pass bead was needed to prevent the automatic machine from burning through the initial root bead. The weld is completed by two passes, or beads, applied by a 5/32-in. wire rod in the automatic submerged arc welding. The two passes are ordinarily made in 2½ minutes on 10-in. pipe.

Special-Type Dollies

Dollies of a sturdy type with ball bearings and rubber rollers have been especially designed to serve automatic welding on the right-of-way. It is claimed that these dollies stop any tendency to "spiral." Since the automatic welding unit rides on the pipe, it is reported that the electrode continues to weld steadily in the bevel even though the pipe is crooked.

The pipe is rotated on the dollies during welding by a knurled chain. The rate at which the pipe is rotated is determined by the maintenance of adequate amperage and voltage. After welding has been completed, the pipe is simply pushed off the dollies by a truck.

On Service Pipe Line's Haskell job all yard welding and pipe-laying operations are handled by Smith Contracting Corp. Yet the general program for utilizing this automatic welding equipment in pipe-line construction is to have it furnished to contractors on a rental basis by Hauser Pipe Line Equipment, Inc., of which O. R. Smith is president. Rentals are charged by the linear foot of pipe. They range from $.035 with tractor and $.025 without tractor for 16-in. pipe up to $.05 and $.04 per foot respectively for 34-in pipe.

An automatic submerged arc-welding unit includes a welding head with turning unit, flux hopper, flux catcher box, air compressor, electric power plant, 600-amp. welding machine (gasoline-engine driven), 35-volt exciter, chipping hammer, air hose, electric cable, electrode hand holder, and 40 dollies. Lincoln Electric wire No. L-60, sizes 1/8 in., 3/32-in., and 4/32-in. and Lincoln Flux No. 760 are used as standard practice in operating the unit.

Welders are given preference for positions as operators of the automatic welding equipment because of their familiarity with welding requirements. However, men without welding experience may be readily trained for this work. Additional personnel include a tractor driver, line-up foreman, stringer-bead welders, and line-up labor.

On a gas-pipe-line project earlier this summer, Smith automatic welding was applied for several weeks in operations on the right-of-way for double jointing 24-in. pipe.

Pressure-Buildup and Well-Interference Tests

(Continued from page 53)

the 6 Webb well with the flowing offset wells. Otherwise, a pressure reaction would have been observed in a much shorter period.

During the 30 hours following 5 days shut in, a decrease in pressure of approximately 3.5 psi. was found in the 6 Webb well. Measurement of pressure was ended at this time to permit the operator to convert the well to gas injection. Even though it was impossible to follow the decrease in pressure for a longer period of time, the observed decrease indicates that offset producing wells were draining oil from the reservoir surrounding the 6 Webb well under conditions imposed by the test in this particular time interval. Therefore, the assumption may be made that the reservoir within the area tested is interconnected.

The productive index of the 6 Webb well computed from the flowing subsurface pressure, the highest observed shut-in pressure, and the production rate is:

$$\text{P.I.} = \frac{337.2}{2{,}089 - 1{,}960} = 2.61$$

The over-all mean effective permeability of the drainage area of the well, including such effects on permeability as may result from well completion, may be computed from the productivity index by the well-known radial flow equation:

$$k = \frac{(\text{P.I.})\ \mu F \log (r_e/r_w)}{0.00307h}$$

where:

- k = permeability, md.
- μ = viscosity, cp.
- F = formation volume factor, bbl. reservoir oil per bbl. stock-tank oil
- r_e = radius of drainage, ft.
- r_w = radius of well bore, ft.
- h = net effective pay thickness, ft.

Using values given previously and a well-bore radius of 3.5 in., the over-all permeability is:

$$k = \frac{2.61 \times 0.40 \times 1.56 \times 3.489}{0.00307 \times 165}$$

The slightly higher value of over-all permeability indicates that the reservoir in the immediate vicinity of the 6 Webb is slightly more permeable than the surrounding drainage area. The over-all permeability includes the effect on permeability of the shot holes in the casing, mud damage, and improvement of the formation permeability by acid treatment.

In considering the results from the tests to determine the nature of the productive formation around the 6

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Webb well, conditions indicated success for a pressure-maintenance program by the injection of gas or water.

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Shamrock Recovers Sulfur At McKee Plant

(Continued from page 63)

In the reactor furnace, which is a refractory lined, horizontal cylindrical vessel designed according to Mathieson patents, the feed gas is burned with a controlled amount of air. The air-to-gas ratio is carefully regulated so that one-third of the hydrogen sulfide in the acid is oxidized to sulfur dioxide, and all hydrocarbons in the feed gas are completely burned.

In addition to the principal SO_2 producing reaction, two secondary ones may occur. These are the direct combustion of H_2S to sulfur, and the reaction of SO_2 with unburned H_2S to form elemental sulfur.

The principal reaction taking place in the furnace, conversion of H_2S to SO_2, is highly exothermic. Heat from this reaction, plus that from the combustion of hydrocarbons, results in the gas leaving the furnace at a temperature as high as 1,900° F. This temperature is well above that desired for optimum conversion of SO_2 to sulfur in the first stage of the catalytic reactor, hence excess heat is utilized to produce steam. About 7,000 lb. per hour of 200-psi. steam is produced in the waste-heat boiler in cooling the flue gases to approximately 650° F. This is sufficient steam for driving the air blower and sulfur reflux pump, for steam jacketing all sulfur flow lines, and for heating the coils in the rundown pit.

A bypass is provided around the boiler to permit passage of combustion gases from the furnace directly into the first converter. This provides satisfactory control of the converter's operating temperature. Such control is important because if the temperature is too low, liquid sulfur may condense on the catalyst bed and in the flow lines; if too high, recovery of sulfur is reduced as pointed out earlier.

The catalytic converter contains two beds of natural bauxite catalyst, separated from one another by a diaphragm in the center of the vessel. The combined gas streams from boiler and bypasses are introduced into the first-stage bed where a considerable portion of the sulfur is formed.

The principal reaction taking place (H_2S reacting with SO_2 to form sulfur) is exothermic; consequently the gas stream must be cooled before passing to the second-stage converter. Accordingly the stream is passed to the boiler feed-water economizer for cooling to the desired temperature. A bypass around the economizer permits temperature control of the gases fed to the second-stage bed. Optimum operating temperature of this bed has been found to be about 500° F., a temperature which results in maximum sulfur conversion without the deposition of liquid sulfur on the catalyst.

From the second bed the gases enter the bottom of the sulfur wash tower. The rising gases are contacted with cooled liquid sulfur which cools and condenses sulfur vapors contained in the gases. Liquid sulfur falling to the bottom of the wash tower is cooled by water cooling coils in the bottom of the tower.

Circulation of cooled sulfur over the tower is provided by a steam-driven, submerged, cast-iron centrifugal pump. As the vapor pressure of sulfur is extremely low at the gas outlet temperature, essentially all elemental sulfur is stripped from the rising gases. Sulfur in excess of recycling requirements is drawn off from the bottom of the tower and flows to a rundown pit.

This pit, of sufficient size to hold 2 days' production, is equipped with submerged steam coils to keep the sulfur in a molten state. Once a day sulfur is pumped to large vats where it is allowed to cool and solidify. In some instances, however, the liquid sulfur is pumped directly to steam-coil-equipped railroad tank cars for shipping in the molten state.

Operation of the plant is extremely simple and highly automatic. Air and gas feed to the furnace is regulated by a proportional ratio controller. All other equipment is provided with automatic controls so that once on stream a minimum of manual operation is required.

Principal process control is maintained by analyzing gas off the final converter, using a modified Tutweiler analysis. An initial titration with standard iodine solution indicates the total quantity of H_2S plus SO_2 present in the gas; a subsequent titration of the resulting solution with standard acid gives an indication of their relative quantities.

Steam generated in the waste-heat boiler is utilized at 150 psi. for driving the air blower and the sulfur-circulating pump. A recording pressure regulator in this system automatically bleeds 50-psi. steam into the system used for heating the rundown pit and all jacketed liquid sulfur lines.

In addition to these steam-jacketing provisions, auxiliary gas burners also are provided for heating the major pieces of equipment in the event sulfur solidification does occur for any reason. After a prolonged shutdown, the auxiliary gas burners are installed through special ports provided for this purpose and used to bring the furnace and other pieces of equipment up to operating temperature. Care also was exercised in designing all sulfur lines so that they drain completely in the event of a shutdown.

All principal equipment is fabricated from low-carbon steel. All heat-transfer equipment is designed to minimize corrosion by acidic gases.

The plant, the first of its type built in a Texas refinery, was designed and constructed by Fluor Corp., Ltd., Los Angeles. Fluor has recently acquired all patents covering this process and is in a position to offer licenses as well as to design, engineer, and construct similar plants for the recovery of pure elemental sulfur from hydrogen sulfide-bearing gases.

More Service From Drilling Lines

(Continued from page 56)

The manufacturers claim the preformed line has less internal stress and is a superior line to the non-preformed. Certainly, the preformed is easier to handle; but, as to strength or service, there is little choice between the two.

The A.P.I. committee on wire lines now has the problem of the choice of a proper safety factor for wire lines under study. This committee may be able to make recommendations in the near future which will enable the contractor to realize greater economies in wire-line cost.

For the small drilling or workover rig, several manufacturers are offering a 6 by 21 construction line in the 1 in. size. This line is giving very good service on small drums and sheaves where it will meet strength requirements. Operators of this size rig will do well to investigate these lines which are more flexible than the 6 by 19 construction normally used.

Particular care should be taken of the excess rope when the extra-long lines are used. The excess line should be kept on the shipping spool and reeled off as needed. The careless tool pusher who lets his excess line lie in the mud or be pulled up and tied to the side of the derrick is not going to realize full service from his longer line.

Acknowledgment

The author wishes to express his sincere thanks to Frank Tuxworth and T. H. Gibbs of Bethlehem Steel Co.; R. D. McNutt of American Chain & Cable Co.; and Joe A. Wilke, Jr., of E. H. Edwards Co., for their assistance and helpful criticism in the preparation of this paper.

W. F. "Fat" Jordan, owner of Hartman & Jordan Drilling Company, Mount Vernon, Illinois, says:

These REED *products help me keep down drilling costs*

"REED Rock Bits give good, long runs"

"My drillers make hole fast with **REED** Rock Bits. Regardless of the formation, regardless of drilling conditions, I can depend on getting good, long runs with **REED** Rock Bits."

"My records show REED Tool Joints last longer"

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"I get good clean cores, with REED Core Drills"

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2877

Williston Basin

(Continued from page 66)

erratic boulders sprinkled along the ridges. South of the river the topography consists of numerous erosional remnant buttes and sharply eroded bad lands with many steep gullies.

There are virtually no section-line roads and practically all of the geophysical work has been done along crosscountry lines. The terrain is particularly rough in the area south of the Fort Peck reservoir in Montana and in the area southeast of Glendive.

Geology. — The surface beds over most of the basin are the Fort Union and Lance formations of the Lower Eocene or Tertiary age, although an island of Cretaceous exists over the Cedar Creek anticline and along the northwest flank of the basin.

Structurally the basin is a rather gently dipping saucer-shaped syncline, tying in with the Powder River basin on the south and the Alberta basin on the north and west. The various beds are nearly flat and essentially conformable. Although some faulting occurs there are few subsurface complexities so that structurally the interpretation of seismic data is rather straightforward insofar as the subsurface beds are concerned.

Seismic crew problems. — Difficulties are associated with surface materials. There are variations in the low-velocity layer which in a few local areas is of sufficient depth to become a weathering problem. Generally, however, shot holes can be drilled to beds of reasonably constant velocity.

Drilling throughout the area should be classed as rather difficult since few entirely shale holes are encountered and many blind holes are found. These blind holes are caused by various porous beds near the surface, particularly lignite beds and clinker beds. Blind holes are unusually troublesome because water is scarce throughout the entire area. North of the Missouri River gravel beds cause drilling difficulties in many areas.

Because of erratic near-surface conditions the quality of reflections throughout the area should be classed from "fair to poor" with a few local areas yielding good reflections.

Nearly all seismograph crews are carrying out reconnaissance programs consisting of continuous profile lines in 2 to 4-mile loops. Practically no spot correlation shooting can be done and some in-line offset shooting has been required because of troublesome ground roll.

Seismic crew costs. — The average crew on a reconnaissance program can cover approximately one township per month and the average total cost per seismograph crew is at least $17,000 per month. The total acreage evaluation would therefore appear to be less than $1 per acre, but this figure must be revised upward in each instance when it is considered that with few exceptions no large solid blocks of the order of one or more townships exist in the area.

Although winter weather conditions in this area are worse than in any other area in this country, many operators will endeavor to work throughout the winter. Others will move out at a predetermined date, such as December 1, or January 1, and still others will endeavor to operate as long as sufficient work days per month can be obtained to justify the cost.

Those operators who have had experience in winter work and know how to winterize their trucks have had neither the time nor the facilities to properly prepare their equipment; others have had no experience in areas of comparable conditions. For the men on the crews in this area it is reasonable to suppose that they predict it will be a long, cold winter.

COST SCHEDULE FOR BASIC SEISMIC CREW—WILLISTON BASIN

INCOME:	
Contract price	$7,750
OPERATION EXPENSES:	
Salaries	$3,300
Supervisor's travel and transportation expense	350
Automobile and truck expense	600
Repairs—recording instruments	35
Repairs—surveying instruments	5
Repairs—shooting instruments	5
Cable—depreciation and maintenance	40
Supplies—recording	100
Supplies—shooting	35
Supplies—surveying	30
Supplies—office, computing and reports	25
Rent	75
Telephone and telegraph	50
Postage	10
Depreciation of equipment	500
Payroll taxes	150
Total	$5,360
OVERHEAD:	
General and administrative expenses	$1,100
Advertising	80
Laboratory services	35
Interest	250
Total	$1,465
TOTAL MONTHLY COST	$6,825
Gross profit	925
Income tax	425
Net profit	$500

Contract prices in the Williston basin for a complete seismic crew, including a 10-man seismic crew and a two-man shot-hole drilling crew, vary from about $9,750 to $10,500 per month, with the shot-hole contracting price varying from $2,000 to $2,500 per month. This schedule indicates a breakdown of the average costs of operation for a basic seismic crew, exclusive of drills.

Costs, Risks, and Profits

This is probably the most undesirable area in the entire United States in which to have a geophysical boom.

Towns are small and far apart. Living costs are unusually high and living conditions are exceedingly adverse. Garages are small and ill equipped and few machine shops exist in the area. Maintenance and repair of equipment are costly and difficult.

Costly area.—This is probably the most costly area in the United States in which to carry on seismograph operations, with the costs actually approaching operational costs in Canada.

The area presents many difficulties of a more serious nature than operations in the Uinta basin, where the next big boom in seismograph operations will probably occur.

Although exploration costs are great, a new oil-producing province has been established. Although many companies have carried on exploration efforts throughout the basin for several years it would seem that Amerada Petroleum Corp., particularly, and also Shell Oil Co., should be commended for their courage in venturing into the area and for their ability to handle the many difficult exploration problems that had to be solved before production was proved.

The long history of exploration activity in this basin, culminating in the recent boom of feverish activity, is indicative of the ever-recurring cycle in exploration in most areas in the constant search for new reserves.

Oil companies must expend millions of dollars before any income is realized. In this regard the oil business is unique in American industry. An exploration program carried on by an oil company is essentially a treasure hunt, albeit an intelligently directed and closely coordinated treasure hunt. Millions of dollars must be spent in each new area before it can be established as an oil-producing province and, once established, more millions must be spent on its development. With the most thorough and scientific guidance of geologists and geophysicists the industry still drills eight dry holes to one producer in its efforts to find new reserves and this ratio is predicated on the wildcats being based on the very best geological and geophysical information.

Crew contracts unchanged.—Due to the intensity of the Williston basin boom, seismograph crews were rushed into the area from other areas that had to be relegated to secondary importance. Most of the crews operating in the area had been operating in other areas and with few exceptions it would seem that other areas were ones of lower operating costs.

In general there were no changes in the existing contracts and the few new crews that began operations in the basin have been granted contracts comparable to the older ones. Profits from crews operating in the area have generally been unsatisfactorily small.

Although geophysical operating costs in the Williston basin are the highest in the United States, operating costs in all areas have continually increased and contract prices have increased very little, if at all. There are various factors which no doubt account for the existence of the situation and in any event since it is unstable it will be rectified.

QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Sulfur From Cracking Plants

Can sulfur be produced from high-sulfur crude oils, and how big a capacity is required?—R. P. C.

The sulfur plants that are attracting so much attention today, operate on hydrogen sulfide as a charge stock. About one-third of the sulfide is burned to sulfur dioxide and the two sulfur gases are reacted catalytically (bauxite catalyst, rich in iron, or even petroleum coke) to produce sulfur. About the only large source of hydrogen sulfide in refineries is thermal or catalytic cracking. Thermal cracking converts about 20 per cent of the sulfur in the feed stock into hydrogen sulfide and catalytic cracking almost 30 per cent.

If such a system is followed, a cracking capacity of about 1,000 bbl. is required to produce 1 ton of sulfur. Thus, for a 50-ton per day sulfur plant, the cracking capacity would have to be about 50,000 bbl. per day. This is based on a sulfur content in the reduced crude feed stock of 2.5 to 3 per cent sulfur and upon a recovery of about 22 to 26 per cent of the sulfur in the feed stock. Obviously, the exact cracking stock capacity will depend upon the sulfur content of the feed and the amount of sulfide produced in the cracking plant.

Adsorption—Absorption—Scrubbing

Can you state for me in layman's language, so plant men and field engineers can understand, good clear-cut definitions for the words "adsorption" and "absorption"? One finds confusion in the minds of field men working in dehydration plants.—F. K.

The question is a good one because technical men are careless or thoughtless in applying many of these terms. They may know exactly what they are talking about but adequate definitions will not be found any place, particularly not in regular dictionaries. There are many fine differences in usage and these can only be explained by discussions and illustrations.

Adsorption

Many solid materials such as charcoal, activated carbon, bauxite, fuller's earths, bone char, activated alumina, silica gel, etc., have the power to hold molecules of gas or liquid on their surfaces by what appears to be a plain physical attraction. The molecules or substances are held on the surface by the phenomenon known as **adsorption** and the various agents that are employed are called **adsorbents.** Some substances are adsorbed or held more firmly than others. Usually the substances that have a big molecule are adsorbed preferentially. Thus, pentane is adsorbed in preference to butane or methane in a gaseous mixture, or asphaltic colored materials are adsorbed preferentially from a raw lubricating oil. For some reason water or water vapor is adsorbed more readily than most hydrocarbon gases or liquids, and adsorbents are used to dry gases as in a gas dehydration plant, or to dry liquefied petroleum gases (a liquid) in a gasoline plant or refinery. The adsorbed substance can be removed by heating the adsorbent agent. This is usually accomplished by the use of superheated steam, but hot inert gases are equally satisfactory.

Just why or how the surface of the adsorbent is more active than the surface of regular solid materials is not completely understood, but it seems to have something to do with minute openings or pores in the surface of such materials. At any rate, it has been found that charcoals that have different sizes of pores will adsorb different sizes of molecules. Big pores are required for big molecules.

Absorption

The phenomenon **absorption,** as employed by chemical or process engineers, applies only to the removal of a particular gaseous component from a gas mixture by a liquid. Materials that consist of large molecules are **absorbed** by liquids in preference to materials whose molecules are small. Thus, pentane (or natural gasoline) is absorbed from a gas more completely than is butane, and butane is absorbed more completely than propane, etc. The absorption liquid is preferably one in which the components in the gas are soluble. Thus, kerosine or distillate fuel oils or heavy gasoline-like solvents are used to absorb hydrocarbons out of a gas, and water would not be satisfactory because hydrocarbons are not soluble in water. Mineral or hydrocarbon oils are used for the absorption of hydrocarbon gases whereas water would be better for the absorption of alcohol vapor out of an air-alcohol gaseous mixture.

For the absorption of water vapor (moisture) out of a gas, a solvent or absorbent liquid that has an affinity for water would be selected. Some of these are sulfuric acid, calcium chloride, ethylene glycol, diethylene glycol, triethylene glycol, glycerin, etc., all of which are liquids (or water solutions) that can be pumped and can be easily contacted with moist gases in contacting or mixing towers. The glycols are preferred as absorbents for moisture mainly because they are noncorrosive, the water can be distilled out of them at reasonably low temperatures, and they do not spoil or deteriorate during the many cycles of heating and cooling as they circulate in the dehydration plant.

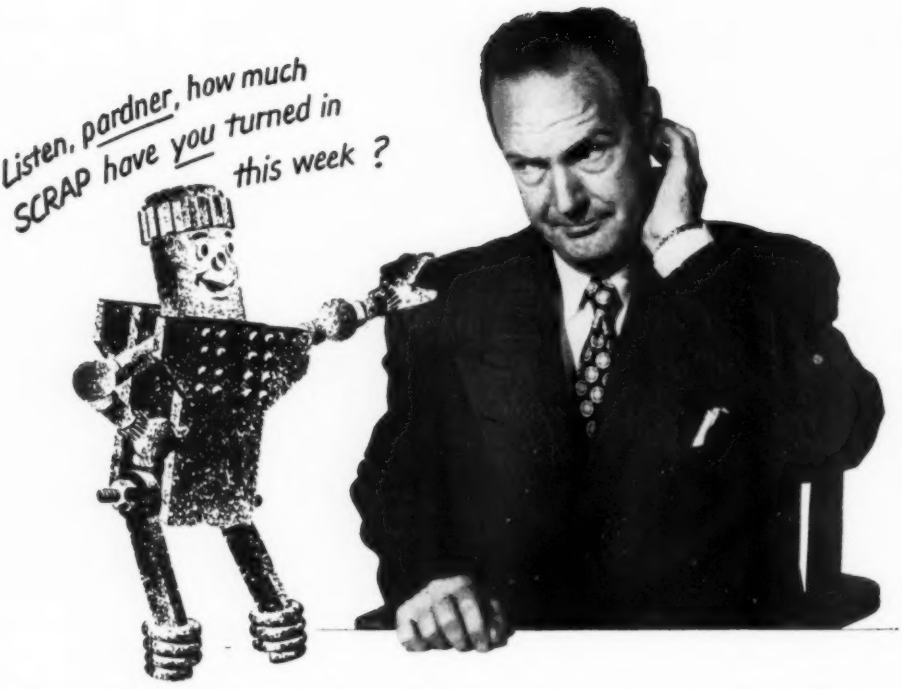
The moisture or absorbed component is usually removed by distillation (or stripping with steam) and hence the absorbent solution is used over and over again as it cycles round and round through the plant, first absorbing moisture and then having the moisture removed by heating.

Although quicklime or anyhdrous calcium sulfate (plaster of paris) also have an affinity for water, they are spoken of as desiccants, not absorption agents. The word absorption is reserved for the action of liquids on gases.

Scrubbing, Mist Extraction, Etc.

These terms are used almost exclusively in describing the removal of suspended liquid (or solid) particles from a gas. The moisture or hydrocarbon components that are removed from gaseous mixtures by adsorption or absorption, as discussed above, were actually in the form of a gas or vapor. Liquid particles, mists, dusts, etc., are not gases or vapors but are suspended as liquid or solid particles in the gas. If such polluted gases are contacted with a liquid or scrubbing agent, some of the particles come in contact with the liquid and are carried out of the equipment as a part of the liquid stream. Another means of eliminating or removing such particles from a gas is by passing the gas through a pad of finely woven wire screen or mesh, or a pad of cotton, wood shavings, metal turnings, or woven fiber. Such devices are called mist extractors or in a sense might be called air (or gas) filters. These devices work mainly by causing the gas to turn sharply and as it changes direction the solid or liquid particles tend to go straight ahead and get caught on a surface or in a liquid. Thus, many mist extractors are mechanical devices consisting of curved plates or baffles that cause the gas to suddenly and repeatedly change direction.

The word absorption is seldom used by process engineers in the sense of liquid particles being soaked up or mopped up as by a sponge or piece of cotton. In this usage the liquid particles are simply held in the holes or spaces between the fibers of the sponge.



Today, the steel business is your business

—*it needs all your SCRAP, Now!*

SUPPOSE that every steel user were suddenly told that he had to turn in a half-ton of scrap before he could get a ton of steel. It would start the most gosh-almighty treasure hunt for scrap that ever happened.

In effect, this "no-scrap, no-steel" situation virtually exists. For without *all* the scrap that industry can search out and start on its way to the mills, steel production will surely drop. It's as serious as that.

More scrap is urgently needed. Today the mills are turning out more steel than ever before. But they're scraping the bottom of the barrel as far as scrap is concerned. Defense and domestic demands for steel simply cannot be met unless at least 100,000 tons of "purchased" scrap roll into the furnaces—*every day.*

The bulk of this scrap must come from industry. That's why we're asking for your all-out help. That's why it's so important that you make the drive for scrap part of your daily operations. Make it your business to encourage every employee to report any obsolete, broken or worn-out machinery, tool or equipment that has seen its day. From this dormant "junk" must come the heavy melting scrap that the mills need most. Don't let your scrap lie idle; send it on its way. How about it, pardner?

You'll find your local scrap dealers listed in the yellow pages of the phone directory.

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CORROSION and its control

The Copper Sulfate Electrode

THEORETICALLY, cathodic protection can halt the attack of corrosion upon any steel structure in contact with the soil. Actually, the problem of devising a system which will supply all of the threatened surface with the current density needed to afford complete protection is sometimes difficult of solution. A case in point is the external surface of well casings, particularly when the severely corrosive zones lie at great depth. It is probable, however, that the problem is capable of solution, and that such structures can be fully protected if sufficiently energetic measures are undertaken.

It has been determined in a number of cases that galvanic currents entering the well head from surface pipe lines can cause damage to the casing at the point of discharge to earth, even when this point lies far below the surface. This process is the exact reverse of cathodic protection, and the mere fact of its existence should be sufficient proof that the protective effect can also be obtained. That it has not been on any very large scale is felt to be due simply to the fact that the process of cathodic protection has not really been given a fair trial on this knotty problem.

A successful solution will not be easy and it will not be cheap. Anodes installed in the immediate vicinity of the well head will inevitably deliver most of their current output to the upper part of the casing; it will thus be necessary to go to considerable distances for the installation of anodes. This will increase the necessary investment in cable; it will increase the amount of power loss in cables; and it will greatly increase the problems of interference with other wells and structures in the neighbohood. None of these problems is insuperable.

It may be necessary to install anodes at much greater depths than those to which we are accustomed in dealing with surface pipe lines. This is especially likely to be the case if the strata near the surface are of significantly higher resistivity than those which are causing the trouble.

Even with anodes spaced out from the well, and set at considerable depths, it is going to be necessary to be more prodigal with current than we would like to be. In order to deliver to the entire surface of the casing—including that lying in contact with some very deep and highly corrosive stratum — a current density sufficient to afford protection, it will be necessary to deliver to the upper section of the casing current densities much higher than required. These may run to 10, 20, or perhaps 50 times the amount needed. Obviously if this is the case, the average current density is going to be quite high.

Fortunately, the application of current greatly in excess of that required for protection does no damage to bare steel. Coated pipe is injured by overprotection; at least the coating is damaged. Amphoteric metals, as for example the lead in telephone and power cables, may be damaged by excessively high current densities. The only undesirable effect of excessive current on bare steel, however, is the wasted energy involved.

Fifteen thousand feet of casing in a well represents a much larger investment than 3 miles of pipe line; consequently more can be spent for its protection. Thus neither the accustomed current - density estimates, nor the usual economic considerations applicable to pipe lines are valid here; a realistic estimate of the situation should make it clear that many possibilities may merit investigation which have been disqualified from pipe-line protection because they are too expensive.

The problems of instrumentation are also quite different. Fewer direct measurements and more mathematical analysis will be required to determine the necessary constants for the correct design of protective systems, as well as for the adequate supervision and control of their operation. The petroleum industry has never been reluctant to attack problems of instrumentation and of mathematical complexity, however, and there is no reason to fear that the difficulties involved here would be too discouraging.

There exist a number of devices and instruments in use for well logging, some of which are directly applicable to the problem at hand, and others of which would require only slight modification to render them useful.

From the foregoing considerations, and from the rather meager results which have been obtained to date, it is clear that this is not a project to be undertaken lightly.

The application of cathodic protection to well casings cannot be looked upon as a job; it must be approached as a program, the working out of which may be expected to require considerable time and money.

One of the preliminary studies which should be undertaken is that of the possibility of predicting the corrosive behavior of the casings in a given field, from data obtained in the drilling of the first wells and from such other sources as may be available. By the time the oldest wells in a field have developed enough casing leaks to pose a serious problem, there are usually a large number of wells in operation which are inevitably exposed to the same conditions, and which may be presumed to be already damaged extensively. Although it may not be too late for effective measures, it is certainly later than the time when such measures would have been most rewarding. On the other hand, protective systems such as we have been discussing are likely to be so expensive that we do not wish to install them unless they are actually required.

Part 34 of a series by Marshall E. Parker, consulting engineer, Houston.

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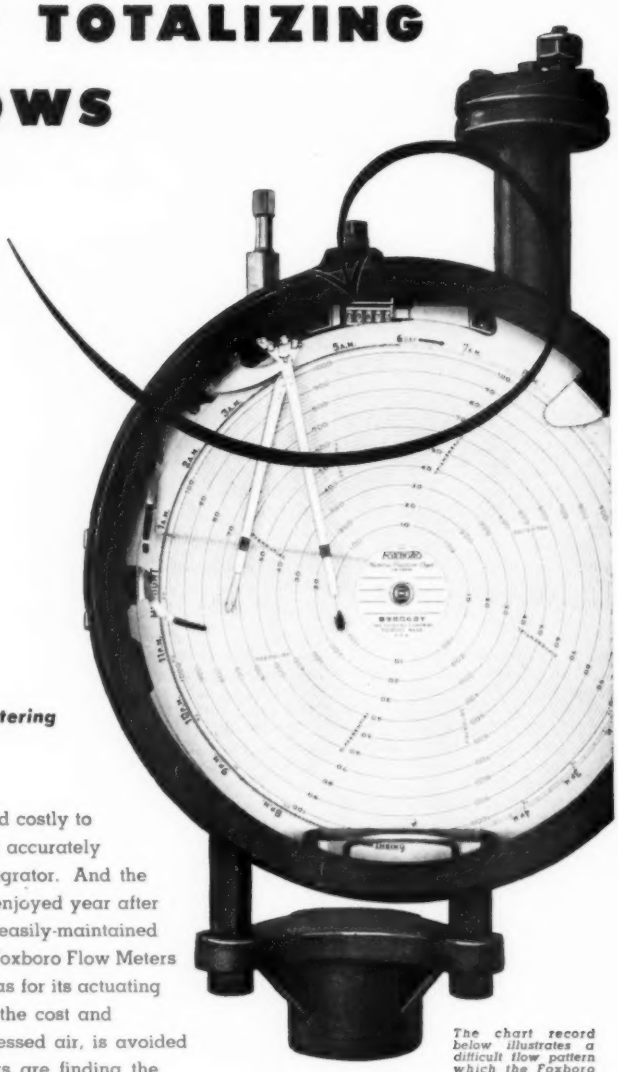

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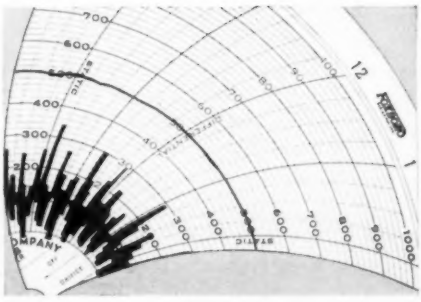

Refractory Construction

by Ray A. Witschey*

REFRACTORY construction is classified according to material used and method applied as: (1) solid masonry construction, (2) suspended masonry construction, and (3) monolithic construction.

Solid masonry.—The greatest advance in solid masonry has been due to improved products. Refractory brick and tile have greater uniformity. Dimensional tolerances are much closer. The use of insulating firebrick and insulating brick permitted many types of composite wall construction resulting in better performance from solid masonry.

Standard shapes (or series) are more numerous and versatile than may be realized. The standard series are more economical, more readily available, and usually possess superior physical properties as compared to special shapes. Manufacturers' literature show the almost unlimited variety of shapes available, as well as tables indicating the various ways and means of using these shapes in refractory structures. Design is simplified and performance enhanced by utilizing the available data. Of even more importance was the development of mortars and coatings for many service needs.

Suspended construction.—Improved methods of suspension and construction using the improved products and developments of the refractory industry have made suspended refractory tile settings more suited for many applications and widely accepted by the industry. Suspended construction utilizing insulating firebrick is used extensively in the petroleum industry.

Monolithic construction. — Many modern industrial furnaces lend themselves to monolithic enclosures constructed of the many specialty refractory products available. Such enclosures consist essentially of plastic and castable construction combinations. These products lend themselves in small patches or shapes as well as extensive areas in complete enclosures. The use of plastic and castable refractory and insulating products to monolithic construction is based on sound engineering principles. The construction of monolithic walls is predicated upon proper anchorage to the outside wall or furnace enclosure. Proper anchorage prevents bulging, cracking, and air infiltration. The anchorage must be secure but still permit free expansion and contraction parallel to the wall surface and still resist the stresses imposed by various operating conditions.

Extremely high wall sections are constructed by the use of a variety of supporting plates. This permits a sectionally supported structure, facilitating installation and permitting easy replacement of any section with low cost maintenance. Flat suspended arches and difficult convection section construction are greatly simplified by the use of plastic and castable refractory and insulation products in combination with suitable supporting plate and anchor assemblies.

Application of Plastic and Castable

An excellent example of the most typical and most commonly found installation would be that of a boiler. This is illustrated in Fig. 1. A typical three-drum low-head boiler illustrating the application of castable and castable refractories shows the method of using refractory anchors in plastic construction. Note particularly the difficult construction of the arch over the stoker openings, and how well this construction lends itself to plastic construction by the intelligent use of anchors, supporting plates, and other constructional members. The methods of anchoring are indicated at the bottom of the illustration.

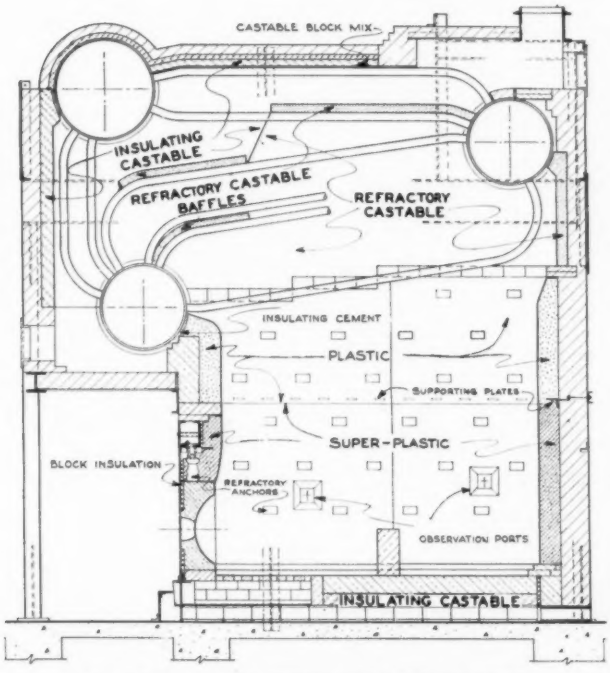

Fig. 1—Boiler installation showing use of plastic and castables.

*Ceramic engineer, A. P. Green Fire Brick Co. Portion of paper presented at John Zink Heating Seminar, Tulsa, 1951.

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That's why we say to all Goodall Rotary Hose owners: ***Never Discard a Goodall Rotary Hose until you contact us.*** And that's why we want to suggest to all rotary hose users: ***Why buy any other rotary hose that does not give you this Goodall combination of extra long life with extra protection for your investment?*** Thanks. Barney.

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CORD CONSTRUCTION—Goodall's flexible cord design provides the extra strength to withstand torsional twist . . . thus eliminating the cause of more than 90% of rotary hose failures.

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GOODALL HAS BEEN **FIRST** WITH EVERY WORTHWHILE ROTARY HOSE DEVELOPMENT

OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

TRADE LITERATURE

1 ASBESTOS PIPE-LINE FELT is a folder describing its resistance to rot and decay, and to acid and alkali soils on oil and gas pipe lines. It is flexible and wraps easy without cracking. *Johns-Manville.*

2 COUPLED-TYPE, PEDESTAL-BEARING SYNCHRONOUS MOTORS in ratings approximately 100 hp. and larger at speeds of 450 r.p.m or less are described in a five-page bulletin. Motors of 1.0 power factor or 0.8 or better leading power factor are available. *Allis-Chalmers Manufacturing Co.*

3 ELECTRIC POWER AND LIGHT FOR EVERY USE describes gas, gasoline, and diesel engine-driven electric plants including all sizes from midgets to giants. The six-page multicolor brochure presents complete data, general information on components and accessories, illustrations, and recommended applications for each model. *Empire Corp.*

4 IMPROVED EMULSIFIER FOR OIL WELL DRILLING FLUIDS. An eight-page, three-color bulletin describes basic use as an emulsifying agent producing stable homogeneous oil-in-water emulsions of superior qualities. It gives characteristics, components, methods of conversion, and maintenance. *Drilling Fluid Div., Macco Corp.*

5 ENNISCOPE PRECISION ELECTRONIC INSTRUMENTS. Bulletin 20 describes cut recorders designed to furnish a continuous charted record of the per cent of water in oil, or other aqueous solutions in hydrocarbons. It also covers tank-bleeder information. *Oil Well Water Locating Co.*

6 AERIAL SURVEYS AND MAPS FROM PHOTOGRAPHS, a 16-page booklet, is a complete explanation of aerial surveying written in simple and nontechnical language. It explains contact prints, mosaics, topographic maps, and special-service, plan, and profile maps. *Abrams Aerial Survey Corp.*

7 BROWN THERMOCOUPLE WELLS. Catalog 200-1 provides technical information concerning the selection of the proper well for any given application. Curves are provided to show the method of selecting the proper well shape and thickness. Photographs and dimensional drawings of all standard Brown wells together with basic prices are shown. *Minneapolis-Honeywell Regulator Co., Brown Instruments Division.*

8 PORTABLE FOAM TOWER is the subject of a four-page circular describing its use for discharging fire-smothering foam onto the surface of burning oil in storage tanks. It is easily assembled in two sections, and can be transported on a small truck or trailer. *Pyrene Manufacturing Co.*

9 HIGH-PRESSURE INDUSTRIAL POWER PUMPS, such as triplex inside and outside packed high-pressure pumps, and multiplex power ends, are discussed in a 28-page booklet. Typical installations, cutaway views, power and fluid end specifications, and dimensional layouts are shown. *John Bean Division, Food Machinery and Chemical Corp.*

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Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, Nov. 1, 1951

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OIL AND GAS EQUIPMENT Digest of NEW ITEMS CHECK IT

10 **BULLETIN 5011** features Nullmatic controllers, control stations, and derivative units. Included is a complete summary of performance data on each instrument. *Moore Products Co.*

11 **LUMMUS BEATS THE CLOCK FOR MAGNOLIA** is a 15-page brochure which tells the story of the design and construction of a 900-ton portable visbreaker heater for Magnolia Petroleum Co. at Beaumont, Tex. It presents a step-by-step tour of the installation and is profusely illustrated. *The Lummus Co.*

12 **OIL-BASE PRODUCTS.** A new four-page folder illustrates and describes facilities of the Oil Base, Inc., plant at Compton, Calif. The products which the company manufactures and company representatives in each area are included. *Oil Base, Inc.*

13 **DAYLIGHT BLACKLIGHT.** A three-page brochure describes the various features and models of Menlo Fluoretor, a portable single-unit ultraviolet generator, fluorescence tester, and comparator combined. Specifications list the materials and exclusive design details which permit the unit to be used in broad daylight. Details are given on registration, guarantees, and operating costs. *Menlo Research Laboratory.*

14 **BULLETIN HE-7** describes typical installations of film-type exchangers which serve as jacket-water coolers, hydrocarbon evaporators, sulfuric acid coolers, and sulfur dioxide condensers, and can be designed to cool or heat any liquid and to condense or evaporate any fluid. *Henry Vogt Machine Co.*

15 **ASBESTOS FABRIC PACKINGS.** A complete line of these packings is illustrated and described in a new four-page bulletin. Also included are complete service recommendations, sizes available, standard packages, and packaging specifications for high-pressure rubber-back, rubber-core, and dual-edge packings. *Raybestos-Manhattan, Inc.*

16 **AMPCO ALLOYS** is a revised 20-page bulletin, in two colors, giving complete information on Ampco alloys as applied in corrosion-resistant service. It includes corrosion-erosion-resistance and cavitation-pitting data along with physical and chemical properties of various aluminum bronze alloys recommended for such service. *Ampco Metal, Inc.*

17 **PROTECT ENGINE-COOLING SYSTEMS** is a four-page, two-color folder on the protection of engine-cooling systems through proper water treatment, and which also covers the prevention of corrosion of diesel and other internal-combustion engines in stationary power plants. *Dearborn Chemical Co.*

18 **DRUM CLEANING.** Bulletin 220, including photographs, line drawings, and plan and elevation drawings, explains how rotoblast technique thoroughly cleans drums and covers. Specifications include plan and front views plus information giving floor space required, over-all height, shipping weight, and other engineering data. *Pangborn Corp.*

19 **IDEAL TYPE 130 CONSOLIDATED DRILLING RIG** incorporating a 1,300-input-hp. draw works is described in a 16-page bulletin, featuring new conveniences, and improvements. Sections are devoted to construction, controls, and design. Specifications and shaft-speed diagrams are included. *The National Supply Co.*

20 **CATALOG SUPPLEMENT** on oil-well subsurface pumps and related production equipment consists of 34 pages and includes cutaway illustrations and complete details on more than a dozen new pumps recently added to the firm's line. These pumps are designed for deep wells, stripper wells, and sandy fluid production. *Harbison-Fischer Manufacturing Co.*

21 **TLB BULLETIN NO. 50-9200** describes a pump developed to solve the leakage, fire hazard, and repacking problems faced in the handling of hydrocarbons. The unit is sensibly priced and is easily installed and operated with a minimum of attention. *Byron Jackson Co.*

22 **CORK AS A THERMAL INSULATING MATERIAL**, a 24-page, multicolor book illustrates the many applications of cork in thermal insulating in processing industries. Thermal conductivity curves, physical properties, mechanical properties, and available sizes of pipe and fittings coverings and sheet cork are covered. *William Kenyon & Sons, Ltd.*

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OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

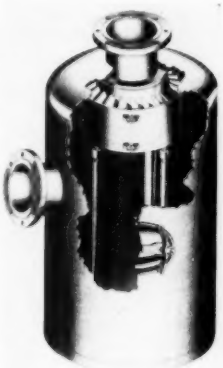
by Dan B. Miller

23 ADJUSTOCRANK is designed to be the safest, speediest, and simplest yet devised. The inward or outward movement of the weights is guided on a round steel bar which is anchored in the crank. Positive location of the weights is actuated with a long acme-threaded screw arrangement that provides for any desired range of minutely sensitive rotary balance, including lead or lag balancing. One man with a lug-type wrench can easily slack off four clamping nuts, position two wing weights, and reset the four clamping nuts. In the outermost position, the weights and crank clear bottom plane of the 12-in. main skids, by 3 in. or more. It also provides counterbalance weights for installation on the integral walking beam extended rearward from the equalizer bearing. *Happy Co.*

IT'S NEW CHECK IT

24 NEW CONSTANT-SUPPORT HANGER, MODEL L, provides simplified field adjustment, increased travel range, and greater load capacity with a smaller number of springs and fewer chassis sizes. The function of a constant-support hanger, to provide equal lift in all position of travel of a piping system as it moves from expansion or contraction between its hot and cold positions, is performed more perfectly. A hanger structure designed for center support which places equal dimensions on each side of the center supporting line, nonresonance in its springing system and provision to give less horizontal shift of the load line as the load shifts from cold to hot positions are three new refinements incorporated in the new design. Maximum travel with constant support has been increased from its former 4 in. to 5 in. in the medium chassis and from 8 to 10 in. in the large chassis. *Grinnell Co., Inc.*

IT'S NEW CHECK IT



25 RECEIVER - TYPE PURIFIER. Applications for this unit include protection to turbines and steam engines by removing damaging slugs of entrainment; use in exhaust steam installations where it is necessary to remove oil and other undesirable entrainment; and removing condensate from compressed-air systems. Chief advantages are: low initial cost, no moving parts, a self-cleaning action which eliminates maintenance, and careful fluid dynamics designing which provides for handling extreme velocities at high efficiency and minmum pressure drop. In steam installations the unit is guaranteed to deliver 99.9 per cent quality steam. In exhaust steam, the unit is guaranteed to remove 99 per cent of the oil. *V. D. Anderson Co.*

IT'S NEW CHECK IT

26 EXTRA TORQUE IMPACTOR HANDLE. Of new, improved design, the Impactor Handle delivers 2.8 times the force of conventional handwheels. It is designed so that the lugs on the underside of the handle strike simultaneous blows against the lugs of an adapter securely attached to the valve stem. The simultaneous

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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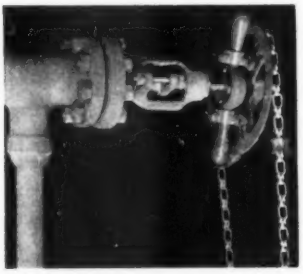
blows prevent stem twist and distortion which would result if the adapter lugs were struck independently.



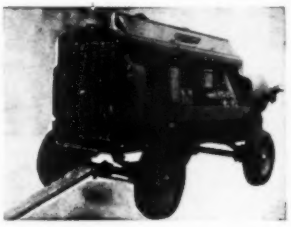
Adaptation of the Impactor Handle to small chainwheels gives operators the benefits of extra torque on a wide range of valve types. It is available with two adapters of different size square openings to fit most standard size stems of various small valve makes. Sizes of the square openings, which taper towards the top, are 13/16 and 15/16 in. with total taper equal to ¾ in. per foot. *Edward Valves, Inc.*

IT'S NEW ✓ CHECK IT

27 12-IN. WECO TONG LINE BLOCK. The 12-in. sheave provides the extra diameter needed to reduce the bend in the tong line and assure faster, easier, and smoother handling of the tongs. Employing a patented drop side, the block is of extra-heavy construction throughout. The sides are heavy steel plate and the sheave is malleable iron with web design to minimize weight without sacrificing strength. The machined groove has no rough edges to cut the line. The sheave is equipped with a needle bearing for smoother, easier running. Other features are its forged-steel swivel eye; precision clearance between sheave and side plates; and ample clearance between swivel and sheave. *Well Equipment Manufacturing Corp.*

IT'S NEW ✓ CHECK IT

28 NEW STANDARD MODEL 365 AIR COMPRESSOR rated at 365 cu. ft. of air per minute at 100 psi. pressure, utilizes a 165-hp. Model HRBI-600 Cummins diesel for its power plant. Engine operated speed of the diesel compressor unit is 1,240 r.p.m. Both the diesel and compressor are mounted on structurally welded main frames. The heavy-duty wagon has an auto-steer front axle, and can be hauled safely at 35 m.p.h. over rough roads. Steel wheels or skid mountings are also available.



Length of the complete rubber-tired unit is 12 ft. 3 in.; width is 5 ft. 10½ in.; height is 6 ft. 9 in.; and weight is 8,500 lb. The 165-hp diesel is a six-cylinder full diesel, with a displacement of 743 cu. in.; a compression ratio of 15.5 to 1; a maximum rated r.p.m. of 1,800; and a net weight of 2,365 lb. *Jaeger Machine Co.*

IT'S NEW ✓ CHECK IT

29 NEW TELESCOPING TILTING FOAM TOWER. An entirely new portable device for discharging fire-smothering foam into a burning oil tank claims the advantages of mobility over rough terrain, ease and speed of erection by three or four men, and efficient delivery of large volumes of foam onto tanks up to 50 ft. in height. It is assembled in two sections: a base with screw-tilting gear mechanism and four spikes for use in case of rough ground; and a telescoped 20-ft., three-section tower with manual winch, two swivel-jointed push poles, and stainless-steel guy ropes. A 6-in. foam column ends in a heat-resistant stainless-steel discharge head. Made principally of aluminum, it weighs 475 lb. A builtin or a forcing-type foam maker with water capacity of 300 g.p.m. makes 2,000 to 3,000 g.p.m. of Pyrene air foam. The tilting mechanism simplifies the application of foam for, with the base in a stationary position, the discharge head can be moved forward 3 to 5 ft. over the tank edge to discharge foam against the inner side of the tank. *Pyrene Manufacturing Co.*

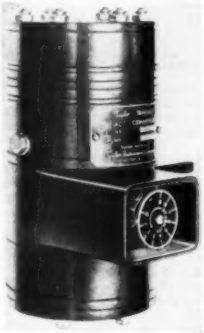
IT'S NEW ✓ CHECK IT

30 L-38 LOW-PRESSURE SWITCH contains a normally opened or normally closed switch actuated by gas pressure and applicable to installations where it is necessary to operate a switch by a variation in gas pressure. Pressure applied against a spring-loaded diaphragm operates to tilt a mercury-tube switch. The diaphragm is made of material impervious to all types of gases, including liquefied petroleum gas, and the spring-loading mechanism may be easily adjusted by a set screw located at the accessible top cover plate. The L-38 is suitable for air or gas applications only, at rated pressures. Installed between an automatic gas valve and a gas burner, for instance, the control insures instantaneous switch operation for a

blower or pump motor or heating equipment. It can also be used as a device to turn on signal lights where gas or air pressure fails. *General Controls Co.*

IT'S NEW CHECK IT

31 TRANSET BI-ACT CONTROLLER is designed for applications where it is desirable to transmit the measured variable to some remote location. It is particularly adaptable to flow, liquid level, or pressure applications requiring fast reset rates and broad throttling bands, or applications where derivative action is not essential. This new controller is another component part of the three-part Transet control system. The controller measures only 7½ in. over-all length and has a range of adjustment of 1 to 200 per cent throttling range and automatic reset of 0 to 100 repeats per minute. It is available with or without the manifold bracket. *Taylor Instruments Cos.*



IT'S NEW CHECK IT

32 AIRLENCO, a new compressed-air line filter which functions also as a condenser, due to its extra size and extended surface, offers a new approach to the problem of removing water and oil from air lines. It has a steel outer shell and a steel inner cartridge, loosely packed with Fiberglas. Air passes down between the inner and outer shells. Expansion of the air and the extensive cooling surface causes any moisture that is in the air to condense and fall to the bottom of the outer shell, where it is discharged through the drain valve. The air then passes through the Fiberglas in the inner cartridge, which baffles out any remaining moisture without appreciably reducing the pressure in the line. Being nonabsorbent, the Fiberglas will last for many years, so that the filter requires no servicing except draining to get rid of the accumulated water and oil. *Air-Line Engineering Co.*

IT'S NEW CHECK IT

33 NEW VANE-TYPE ROTARY PUMP. A heavy-duty, vane-type rotary pump has been added to the existing line of Worthington rotary pumps. All models are positive-displacement, sliding-vane type in which the pressure of the liquid being pumped maintains contact of the vanes against the liner. The pumps are manufactured in both internal and external-bearing design; the external-bearing models being especially suited for nonlubricating liquids such as gasoline and kerosine. The pumps are manufactured with builtin relief valve and can be manufactured in either standard fitted, bronze fitted, or in all-bronze construction. *Worthington Pump & Machinery Corp.*

IT'S NEW CHECK IT

34 NEW HOE ATTACHMENT for the Koehring 304 excavator will increase the machine's digging depth to 19 ft. 9 in. Other improvements made on the Model 304 provide extra resistance to side sway and extra strength to meet any operating condition for belowground level excavating. Officially rated as a ¾-yard excavator, the 304's sturdy dipper arm is pivoted at the end of the boom and jackknifes to dig a vertical backwall. Position of the counter shaft in line with boom foot mounting eliminates dipper drift when the boom is raised. Use of double digging lines to the sturdy dipper eliminates reverse cable bends. Adjusting links on the dipper arm allow for three variable settings so that the dipper angle can be matched to the type of material and cut being made. *Koehring Co.*

IT'S NEW CHECK IT

35 MODEL G-200 AIR HAMMER, a light hand tool weighing just slightly over 2 lb., is so designed it will perform medium - heavy - duty work in general shop and maintenance operation. Working at 120 psi. this air hammer strikes up to 6,000 blows per minute, with maximum force, or may be metered to any lower speed or striking power by means of a simple finger trigger action. This air hammer is offered singly or with specialized tool kits for various types of services, such as maintenance, welding, foundry, motor block repair, scaling, and caulking. Sixty-six different tools are regularly available, and blanks are offered for making individual tools for specialized tasks. *Salsbury Corp.*

IT'S NEW CHECK IT

36 POR-ROK, a new floor-patching compound, sets hard in 15 to 30 minutes. Permanent repairs to chuck holes or breaks in concrete floors can be made quickly during working hours by using Por-Rok quick-setting cement. Clean out the hole or break, mix Por-Rok with water, and pour into the opening. Por-Rok is self-bonding, will not shrink, and requires no troweling for a perfect finish. The patch is ready for light loads in 15 minutes, normal trucking in 30 minutes, and heaviest loads within 1 hour. Por-Rok's compression strength is of 4,500 psi. *The Hallemite Manufacturing Co.*

IT'S NEW CHECK IT

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Pipe-Line Construction

FOLLOWING is a tabulation of pipeline projects which are planned or under construction. Included are crude-oil, products, and natural-gas lines. This list is compiled from surveys made by The Oil and Gas Journal.

Crude-Oil Pipe Lines

Alberta-Vancouver Oil Pipe Line Co. (Brokaw, Dixon, McKee).—972 miles, 16-in., proposed, Edmonton via Pincher Creek, Alta., Idaho and Washington states to Vancouver, B. C.

Continental Pipe Line Co.—105 miles, 8-in., authorized, Rincon to northwest of Sullivan City on to Port Isabel, Tex. Completion date 1952.

Continental Pipe Line Co.—217 miles, 12-in., authorized, Wichita Falls, Tex., to Ponca City, Okla. Completion date 1952.

Derby Oil Co.—15 miles, 6-in., authorized, Wichita to Bentley, Kans. Completion date 12-51.

Gulf Refining Co.—87 miles, 14-in., contracted, Lumberton, Miss., to Mobile, Ala. Anderson Bros. Completion date, 1-1-52.

Ohio Oil Co.—117 miles, 22-in., under way, Sheridan, Ind., to Lima, Ohio. R. A. Conyes, contractor.

Pan American Pipe Line Co.—27 miles, 16-in., Genoa to Texas City, Tex. Completion date 12-52.

Pan American Pipe Line Co.—40 miles, 14-in., Arden Station in Irion County to Eldorado Station in Schleicher County. 6-52.

Phillips Oil Co.—28 miles, 12-in., authorized, Sweeny to Freeport, Tex.

Phillips Oil Co.—Authorized, Midland, Glasscock, Reagan, and Upton counties.

Platte Pipe Line Co.—1,075 miles, 16-20-in., under way, Worland, Wyo., to Wood River, Ill.

Platte Pipe Line Co.—573 miles, 16-20-in., under way. Winchester, Wyo., to Brule, Neb. R. H. Fulton & Co. (Sections 1, 2, 3, and 4.—Section 1, 126 mi. of 16-in., remainder 20-in.). A. A. Carrigan, spreadman at Casper, Wyo., field office.

Platte Pipe Line Co.—142 miles, 20-in., under way, near Marysville, Kans., to Holdredge, Neb. Bishop & Lock (Section 5); H. LaQuey, spreadman.

Platte Pipe Line Co.—100 miles, 20-in., under way, northern edge of Kansas. Rumsey Bros., contractor of Section 6.

Platte Pipe Line Co.—(Section 7). 274 miles, 20-in., Missouri River to Salisbury, Mo., and (Section 8) Salisbury to Mississippi River, under way, field office, Mexico, Mo., B. C. Hall, spreadman; River crossing field office, Hartford, Ill., Dick Jernigan, spreadman.

Progress Pacific Pipe Line Co.—900 miles, 20-in., proposed, Permian basin, West Texas, to California.

Rancho Pipe Line System.—464 miles, 24-in., authorized, McCamey to Houston, Tex. Company crews. Completion date 1952. (Joint project with Sinclair Pipe Line Co., Pan American Pipe Line Co., Tidewater Pipe Line Co., Nantucket Pipe Line Co., and Phillips Pipe Line Co., with Shell Pipe Line Corp. handling construction and operation.)

Rancho Pipe Line System.—66 miles, 8-in., authorized, Gohlke to La Grange, Tex. Company crews. Completion date 1952.

Roosevelt Oil & Refining Corp.—22 miles, 4 and 6-in., authorized, St. Helens to Norwich, Mich.

Service Pipe Line Co.—19 miles, 16-in., under way, Raytown to Sugar Creek Ref., Mo. Sheehan Pipe Line Const. Co., contractor. J. W. Brown, spreadman at Raytown, Mo.

Service Pipe Line Co.—29 miles, 20-in., authorized; Drumright, Okla., to Humboldt, Kans.; 30 miles, 20-in., contracted, Freeman to La Plata, Mo., G. G. Griffis Const. Co.; 24 miles, 10-in., contracted, Denton, N. M., to Wasson, Tex., Crossley and Hardy, contractor.

Sinclair Pipe Line Co.—674 miles, 22-24-in. authorized; Drumright, Okla., to E. Chicago, Ind.

Texas-New Mexico Pipe Line Co.—75 miles, 8-in., planned, Midland to Germania pool; Midland to Scarborough and Sweetie Peck area; and Crane station to McElroy area, West Texas.

Texas-New Mexico Pipe Line Co.—55 miles, 8-in., planned, Eunice to Covington and Saunders area, New Mexico.

West Texas Gulf Pipe Line Co.—467 miles, 26-in., authorized, Colorado City to Wortham, Tex., 26-in.; Wortham to Sour Lake, Tex., 24-in. Completion date 10-52.

West Texas Gulf Pipe Line Co.—114 miles, 20-in., authorized, Wortham to Longview, Tex. Completion date 10-52.

Products Pipe Lines

Bell Oil & Gas Co.—150 miles, 6-in., planned, Ardmore to Drumright, Okla.

Buckeye Pipe Line Co.—430 miles, 14-in., proposed, Linden, N. J., to Allentown, Pa., Junction; Chelsea, Pa., via Allentown Junction to Auburn, Rochester, Syracuse and Oswego, N. Y. Start 1952; finish 1953.

Ohio Oil Co.—24 miles, 8-in., authorized, East St. Louis to Wood River, Ill.

Phillips Pipe Line Co.—46 miles, 12-in., under way, looping from Buffalo, Okla., to Borger, Tex. Arey Phillips Const. Co. 10-51 completion date.

Phillips Pipe Line Co.—48 miles, 12-in., under way, looping from Wichita, Kans., to Buffalo, Okla. G. G. Griffis Const. Co. Joe Bishop, spreadman, at Wichita, Kans. 11-51 completion date.

Phillips Pipe Line Co.—101 miles, 8-in., under way, looping from East St. Louis to Decatur, Ill. Brown Lite Co., contractor. R. E. Carraker, spreadman at Taylorville, Ill.; Hedge Edmonds, spreadman at Litchfield, Ill. Completion date 11-51.

Phillips Pipe Line Co.—74 miles, 8-in., under way, looping from Decatur, Ill., to East Chicago, Ind. Somerville Const Co., contractor. 12-51 completion date.

Phillips Pipe Line Co.—69 miles, 12-in., authorized, looping from Paola to Wichita, Kans.

Phillips Pipe Line Co.—137 miles, 10-in., authorized, looping from Paola, Kans., to East St. Louis, Ill. Completion date 11-51.

Plantation Pipe Line Co.—707 miles, 14 and 18-in., under way, Baton Rouge to Charlotte, N. C., 275 miles, 14-in., under way, Bremen to Charlotte, N. C.; 432 miles, 18-in., under way, Baton Rouge to Bremen, Ga.; 220 miles, 18-in., Baton Rouge to Mississippi-Alabama state line; Williams Brothers Co. David R. Williams, Jr., project manager.

Progress Pacific Pipe Line Co.—900 miles, 10-in., proposed, California to West Texas.

Salt Lake Pipe Line Co.—Proposed, Pasco, Wash., to Puget Sound.

Sinclair Pipe Line Co.—8-in., proposed, Sinclair, Wyo., to Salt Lake City, Utah; 10-in., Houston to Baton Rouge; 16-in., Kalamazoo to Detroit; 20-in. Marcus Hook to Bayonne, N. J.; East Chicago to South Bend, Ind.

Standard Oil Co. (Ind.).—122 miles, 8-in., under way, Neodesha, Kans., to Belton, Mo. Bills & Troth Construction Co., Carl Bills, superintendent, at Armory Building, Neodesha.

Standard Oil Co. (Ohio).—17 miles, 6-in., authorized, Toledo to West Toledo, Ohio.

Tuscarora Oil Co., Ltd.—61 miles, 10-in., authorized, Knappenberger to Midland, Pa.

Natural-Gas Pipe Lines

Algonquin Gas Transmission Co.—276 miles, proposed, Greenwich, Conn., to Boston area; 492 miles, proposed, laterals-New England area.

Allied Gas Co.—24 miles, 6⅝-in., proposed, McLean to Champaign County, Ill.

Amere Gas Utilities Co.—11 miles, 8-in., authorized KA-5 loop, Priceton and Athens, W. Va. Completion date December 1951.

Amere Gas Utilities Co.—16 miles, 8⅝-in., proposed, loops from Mercer County to Princeton, W. Va.

Amere Gas Utilities Co.—15 miles, 8⅝-in., proposed, near Dameron to Flat Top, W. Va.

Arkansas Louisiana Gas Co.—16 miles, 8⅝-in., Claiborne Parish to Columbia County, Ark.

Associated Natural Gas Co.—88 miles, authorized, Missouri.

Associated Natural Gas Co.—14 miles, 6-in., under way, Sikeston to Charleston, Mo. Boot Heel Construction Co. Completion date 12-1-51.

Carolina Natural Gas Corp.—185 miles 2-12-in., proposed, lateral lines off Transcontinental in North and South Carolina.

Cities Service Co.—80 miles, 4-22-in., under way, Grant, Haskell, and Seward counties, Kansas. Cheek Construction Co. Completion date 12-1-51.

Cities Service Gas Co.—179 miles, 4-30-in., gathering system in vicinity of Ulysses, Kans. Vaughn & Taylor Const. Co., Inc. D. D. Vaughn, spreadman, Ulysses.

Coast Counties Gas & Electric Co.—41 miles, 3, 4, and 8-in., planned, Coast and Valley region, California.

Colorado Interstate Gas Co.—250 miles, 20-in., under way, Kit Carson, Colo., to Amarillo, Tex. R. H. Fulton & Co., contractor. Jerry Nash, spreadman at Lamar, Colo.

Commonwealth Natural Gas Corp.—53 miles, 20-in., proposed, West Bend, Ky., to Norfolk, Va.

Consolidated Gas Utilities Corp.—24 miles, 10¾-in., authorized, Marlow field to Fort Sill, Okla. Completion date 12-1-51.

Cumberland and Allegheny Gas Co.—46 miles, 10-in., authorized, Mountain Lake Park, Md., to Preston County, W. Va.

Dow Chemical Co.—70 miles, various sizes, Midland, Saginaw, and Bay City, Mich.; Mahoney Contracting Co., contractor, Ralph Bucher, spreadman at Midland.

East Ohio Gas Co.—65 miles, 26-in., under way, near Petersburg to Cleveland, Ohio. Williams Bros., contractor. Completion date 12-1-51.

East Tennessee Natural Gas Co.—172 miles, 22-in., authorized, Greenbrier to Oak Ridge, Tenn.

East Tennessee Natural Gas Co.—100 miles, 16-in. proposed, Knoxville to Kingsport, Tenn.

Egyptian Natural Gas Co.—80 miles, 6-8 in., authorized, Norris City to Salem-Centralia, Ill., area.

El Paso Natural Gas Co.—123.9 miles, 30- in., proposed, looping along main line in Texas, New Mexico, Arizona.

Empire Southern Gas Co.—22 miles, 3-3-4-in., authorized, Ozona, Crockett County, Texas, to Ozona Distribution system.

Equitable Gas Co.—17 miles, 16-in., under way, near Pittsburgh. H. L. Gentry Const. Co., contractor. Lavern Curtis, spreadman at Sewickley, Pa.

Georgia Gas Co.—32 miles, 4½-in., proposed. Bogart to Gainesville, Ga.

Glacier Gas Co.—285 miles, 20-in., proposed, Kalispell, Mont., to Spokane, Wash.

Glacier Gas Co.—120 miles, 16-in., proposed, Spokane to Hanford, Wash.

Glacier Gas Co.—91 miles, 8⅝-in., proposed, Spokane to Lewiston, Idaho.

Glacier Gas Co.—130 miles, 12¾-in., proposed, Spokane to International Boundary at Trail, British Columbia.

Grand Valley Pipe Line Co.—105 miles 8-10-in., planned, Piceance Creek field to Rifle on to Grand Junction, Colo.

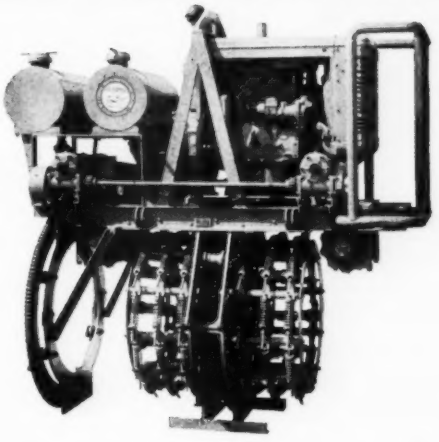
Gulf Michigan Transmission Corp.—680 miles, 30-in., proposed, Perryville, La., across Arkansas, Missouri, and Illinois to terminus near St. John, Ind.

Home Gas Co.—17 miles, 12-in., proposed, loops from Hancock to Sanford, N. Y.

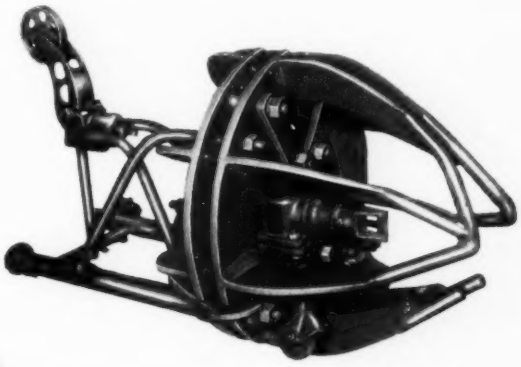
Iowa-Illinois Gas & Electric Co.—41 miles, 10-in., authorized, Washington County to Cedar Rapids, Iowa.

Kansas-Nebraska Natural Gas Co.—40 miles, 6-in., under way, Albion to Norfolk.

For Cleaning and Lineup



MODEL "K" PIPE CLEANING AND PRIMING MACHINE can be set up to clean and prime pipe from 16" to 26" in diameter. May be used line-traveling or on stationary base. This machine is also available for larger pipe sizes.



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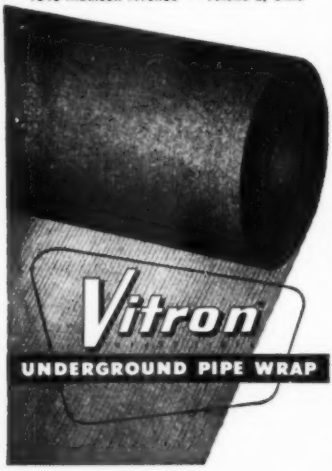

Neb. Jayhawk Const. Co., Inc., contractor; F. A. Faler, spreadman at Albion.

Kansas-Nebraska Natural Gas Co.—30 miles, 6-in., under way, Albion to Neligh, Neb. Jayhawk Const. Co., Inc., F. A. Faler, spreadman at Albion.

Kansas-Nebraska Natural Gas Co., Inc.—60 miles, 8-10-12-in., under way, Grand Island to Albion, Neb.

Kansas - Nebraska Natural Gas Co.—65 miles, 2-8-in., planned, Big Springs field to Ogallala, Neb., and to Ovid, Colo.

Kansas-Nebraska Natural Gas Co., Inc.—39 miles, 4 and 6-in., planned, Neligh to O'Neill, Neb., 54 miles, 4 and 6-in. planned, Neligh to Hartington, Neb. (extension). Completion date 1952.

Kansas Power & Light Co.—27 miles, 20-in., authorized, Pratt, Kans., to Calista compressor station.

Lake Shore Pipe Line Co.—45 miles, 10¾-in., authorized, northwesterly from T.G.T. system near Meadville, Pa., to Ashtabula, Ohio.

Manufacturers Light & Heat Co.—78 miles, 16-in., contracted, Berwindale, Pa., to near Saltsburg, Pa. Britton Construction Co., contractors.

Michigan Gas Storage Co.—94 miles, 8-24-in., authorized, Laingsburg to Mt. Clemens, Mich.

Michigan Gas Utilities Co.—77 miles, authorized, Sturgis, Hillsdale and Coldwater, Michigan. (22.7 miles, Marshall south to Coldwater; 20 miles, Coldwater easterly to Hillsdale; 22.5 miles, Hillsdale to Sturgis; 11 miles, Hillsdale to Jonesville).

MidSouth Gas Co.—240 miles, proposed, Greene, Poinsett, Crittenden, St. Francis, Lee, Phillips, Monroe, Woodruff, and Cross counties, Arkansas.

Montana Power Co.—18 miles, 16-in., proposed, Pakowki Lake area to Canada-Montana border.

Montana Power Co.—52 miles, 16-in., proposed, Canada - Montana border to Cut Bank, Mont.

Mississippi River Fuel Corp.—96 miles, 16 and 18-in., authorized, feeder line from Lincoln Parish, La., to Waskom field, Harrison County, Texas.

Mississippi River Fuel Corp.—40 miles, 18-in., authorized, Dubach to Perryville, La.

National Utilities Co. of Michigan.—76.7 miles, 20-in., proposed, South Central Michigan. (22 miles from near Marshall south to Coldwater; 20 miles east to Hillsdale. 22 miles southwest to Sturgis; 5 miles from Hillsdale to Jonesville and 6 miles west to Union City.)

Nevada Natural Gas Pipe Line Co.—114 miles, proposed, Topock, Ariz., to Las Vegas, Nev.

New River Gas Co.—50 miles, planned Summers or Monroe counties, W. Va., to Narrows and Dublin, W. Va.

Niagara Mohawk Power Corp.—40 miles 10-12-16-in., under way, lateral lines at Utica, N. Y.; 55 miles, 10-in., Fulton to Watertown, N. Y.; Williams-Austin Co. contractor, Howard Bauer, supt.

Northeastern Gas Transmission Co.—81 miles 20-24-in., authorized, New Hampshire, Massachusetts, and Connecticut.

Northeastern Gas Co.—411 miles, proposed, New England towns.

Northern Natural Gas Co.—580 miles proposed, Kansas, Texas, Oklahoma, and Nebraska loops.

Northern Natural Gas Co.—370 miles 4-26-in., authorized, gathering lines in Hugoton field.

Northern Natural Gas Co.—217 miles, 26-in., under way, Palmyra, Neb., to Skellyville, Tex. G. G. Griffis Const. Co., contractor; field office, Beatrice, Neb.; G. L. Mims, superintendent; E. G. Grisham spreadman.

Northern Natural Gas Co.—210 miles, 26-in., proposed, five loops in Texas-Oklahoma area, two in Kansas, and two in Nebraska.

Northern Natural Gas Co.—181 miles, 4-12-in., contracted, gathering system in Hugoton area. Reese Bros. Const., contractor.

Northern Natural Gas Co.—108 miles, 26-in., under way, Beatrice, Neb., to Mullenville, Kans. G. G. Griffis Const. Co. G. L. Mims, spreadman at Beatrice, Neb. Completion date 12-1-51.

Northern Indiana Fuel & Light Co.—33

Getting rock out of ditch for a 22" pipeline in the Southwest.

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miles, 8-in., proposed, Edgerton to Auburn, Ind.

Northwest Natural Gas Co.—750 miles, planned, Washington, Oregon, and Idaho.

Ohio Fuel Gas Co.—22 miles, 16-in. authorized, Dayton, Troy, Piqua, and Sidney, Ohio.

Ohio Fuel Gas Co.—23 miles, 16-20-in., authorized, Wellington to Elyria, Ohio; 16 miles, 20-in., authorized, Benton Station, to Crawford Station, completion date 11-15-51; 16 miles, 20-in., Crawford Station, to near Columbus, completion date 12-31-51; 16 miles, 16-in., authorized, Berlin Heights to Sandusky, Ohio, completion date 12-31-51.

Ohio Fuel Gas Co.—74 miles, 3 to 20-in., authorized, Hocking, Knox, and Ashland counties, Ohio.

Ohio Fuel Gas Co.—47 miles, 20-in., authorized, Benton Township, Hocking County, to Columbus, Ohio.

Ohio Fuel Gas Co.—61 miles, authorized, northern and southwestern Ohio.

Oklahoma Natural Gas Co.—16 miles, 8⅝-in., authorized, Shamrock to Cushing, Okla.; 33 miles, 24-in., authorized, Depew to Kellyville, Okla.; 9 miles, 12¾-in., Stroud to Depew, Okla.

Oklahoma Natural Gas Co.—40 miles, 16-in., under way, Ninnekah, Okla., to County Line, Okla.; Trojan Construction Co., contractor.

Oklahoma Natural Gas Co.—26 miles, 12-in., authorized, Ringwood to Enid, Okla. Completion date January 1952.

Oklahoma Natural Gas Co.—40 miles, 2-36-in., authorized, Ringwood field gathering system. Completion date January 1952.

Pacific Gas & Electric Co.—44 miles, 8-in., under way, Salinas to King City, Calif.

Pacific Gas and Electric Co.—141 miles, 34-in., proposed, parallel sections along Topock-Milpitas line.

Pacific Gas & Electric Co.—10 miles, 10-12-in., authorized, Monterey to Fort Ord to Castroville; 12 miles, 16-in., Napa Wye to Shellville; 6 miles, 12-in., Cotati to Santa Rosa, Calif.

Pacific Northwest Pipe Line Co.—400 miles, 22-in., gathering lines on Texas Gulf Coast to Pacific Northwest pipe line.

Pacific Northwest Gas Pipe Line Corp.—3,175 miles, planned, Wharton County, Texas, via Oklahoma, Kansas, Fort Collins, Colo., to Portland, Ore., Tacoma and Seattle, Wash.

Panhandle Eastern Pipe Line Co.—70 miles, 24-26-in., under way, looping from Sneed, Tex., to Emporia, Kans.

Panhandle Eastern Pipe Line Co.—174 miles, 30 and 26-in., contracted, Tuscola, Ill., eastward—looping present system; R. A. Conyes, contractor. 44 miles, 26-in., Edgerton, Mich.; Anderson Bros.: 22 miles, 30-in., looping in Tuscola, Ill.; 45 miles, 30-in., looping in Montezuma, Ind.; 63 miles, 30-in., looping in Zionsville, Ind.

Pennsylvania Gas Co.—52 miles, 12-in., between Warren and Erie, Pa. (Sect. 1—37 miles, under way and contracted by Harford Bros. Sect. 2—25 miles.

Peoples Natural Gas Co.—25 miles, proposed, Cambria and Blair counties, Pennsylvania.

Phillips Natural Gas Co.—20 miles, 8-in., under way, Blue Lake to Chocolate Bayou, Tex. 10-51 completion date.

Phillips Petroleum Co.—118 miles, 3-22-in., under way, Sherman and Hansford counties, Texas gas-gathering system; Vaughn & Taylor Construction Co., Inc., Dumas, Tex., J. F. Crawford, spreadman at Texhoma, Okla.

Piedmont Natural Gas Co.—28 miles, 6-in., proposed, North Carolina—laterals from Transcontinental gas system.

Prince George's Gas Corp.—20 miles, 22-in., authorized between Chillum and Rockville, Md.

Public Service Co. of North Carolina.—33 miles, 10-in., authorized, Burlington to Chapel Hill, N. C., completion date 3-1-52; 16 miles, 8-in., authorized, Chapel Hill to Raleigh, N. C., completion date 7-1-52; 29 miles, 4-in., authorized, Statesville to Kanapolis, N. C., completion date 7-1-52; 83 miles, 8-in., authorized, Kings Mountain to Asheville, N. C., completion date 3-1-53.

Rockland Light & Power Co.—22 miles, 8-in., proposed, Orangetown to Tompkins Cove, N. Y.

Southern California Gas Co.—35 miles, planned, Antelope Valley, California.

Southern California Gas Co. and **Southern Counties Gas Co.**—36 miles, 6-8-in., contracted, Palmdale to Mojave, Calif. Alex Robertson Co., contractor. E. C. Neal, spreadman at Lancaster, Calif., completion date 11-1-51.

Southern California Gas Co., and **Southern Counties Gas Co. of California.**—81 miles, 30-in., proposed, Whitewater to Desert Center, Calif.

Southern California Gas Co.—24 miles, 30-in., under way, Inglewood to San Ferdando Valley, California. Alex Robertson Co., contractor. Completion date 11-51.

Southern Natural Gas Co.—21 miles, 24-in., authorized, Perryville Station, La., to Boeuf River.

Southern Natural Gas Co.—14 miles, 24-in., authorized, Onward Station, Miss., to Big Sunflower River.

Southern Natural Gas Co.—14 miles, 14-in., authorized, Perryville Station, La., to Wilhite Gate.

Southern Natural Gas Co.—375 miles, 24-in., planned, Gwinville, Miss., to Atlanta, Ga.

Southern Natural Gas Co.—169 miles, proposed loops, Ouachita Parish, Louisiana, to Augusta, Ga.; 20 miles in Ouachita Parish; 33 miles in Ouachita and West Carroll parishes; 7 miles, Sharkey County, Mississippi; and 108 miles, 14-in., Bass Junction to Augusta, Ga.

Southern Union Gas Co.—15 miles, 20-in., authorized, Albuquerque main line; 18 miles 12¾-in., San Juan County, N. M.; 18

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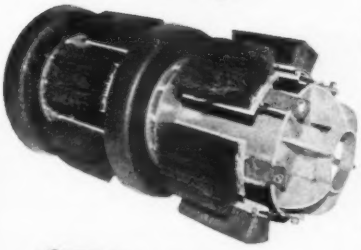
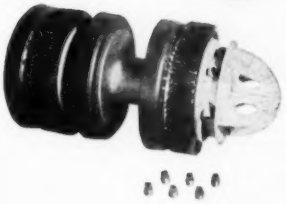


Type GP-4 Pig 16" to 30" sizes. Similar design for 10" to 14" sizes. Brushes expanded by arched springs. Brush & cup service life up to 1,000 miles.



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miles, 8⅝-in., authorized, Clovis to Portales N. M., completion date 12-51.

Southwest Gas Corp., Ltd.—26 miles, proposed, from P. G. & E. line to Victorville Calif.

Sunray Oil Corp.—133 miles, 3-30-in., under way, system for Snyder gasoline plant Vaughan & Taylor Construction Co., contractor. D. D. Vaughn, spreadman.

Tennessee Gas Transmission Co.—80 miles, 30-in., planned, first 150 miles of loops to be laid at Monroe, La., Greenville Miss., Midland and Portland, Tenn.

Tennessee Gas Transmission Co.—43 miles, planned, looping on Buffalo and New England extensions.

Tennessee Gas Transmission Co.—304 miles, 24-in., proposed, between Mercer Pa., and Utica, N. Y.; 528 miles, proposed loops; 200 miles, proposed, miscellaneous lateral lines.

Tennessee Gas Transmission Co.—158 miles, 30-in., under way, vicinity of Jones La., on the north to near Cypress, Tex., on the south; Houston Contracting Co. Four spreads located as follows: North end work at Bastrop, Tex., W. H. Hayes and M. L. Thompson, superintendents; center section at Natchitoches, La., E. C. Norris and R. E. Thornton, superintendents; south end at Conroe, Tex., F. A. Silar, superintendent.

Tennessee Gas Transmission Co.—64 miles 26 and 30-in., loops, contracted, South Texas. Oklahoma Contracting Co., contractor, field office, Falfurrias, Tex., Panama Shiflett, superintendent.

Tennessee Gas Transmission Co.—156 miles 24-in., under way, Hamburg to Onondaga Madison County line, N. Y.; H. C. Price Auburn and Warsaw, N. Y., field offices G. A. Reutzel and R. K. Shivel, spreadmen

Tennessee Gas Transmission Co.—120 miles 24-in., under way, Hamburg to Hudson River; Bechtel Constructors, Inc.; Richfield Springs, N. Y., project office, R. L. Bowman and W. N. Molander, superintendents.

Tennessee Gas Transmission Corp.—419 miles, 26-30-in., authorized, loop line along presently authorized system.

The Texas Co.—27 miles, 8-in., authorized, Ventura to Filmore, Calif.

Texas Eastern Transmission Corp.—79 miles, 30-in., under way, Kosciusko, Miss., to Connellsville, Pa.

Texas Eastern Transmission Corp.—50 miles, 30-in., under way, Ohio River to Vanceburg, Ky. Trojan Construction Co., Inc., contractor. Charles Tillotson, spreadman at Winchester, Ky.

Texas Eastern Transmission Corp.—70 miles, 30-in., under way, Cumberland River to Columbia, Ky. Oman Construction Co., contractor. William Smith, superintendent and Floyd Hudnell, spreadman at Columbia, Ky.

Texas Gas Transmission Corp.—35 miles, 12-in., authorized, Slaughters, Ky., to Evansville, Ind.

Texas Gas Transmission Corp.—169 miles, 26-in., authorized, Acadia Parish to connection with existing facilities in Morehouse Parish.

Texas Gas Transmission Corp.—195 miles 26-in., proposed, Gulf Coast region to southwestern Louisiana.

Texas Gas Transmission Corp.—425 miles 26-in., proposed, looping from Bastrop, La. to Hardinsburg, Ky.

Texas Gas Transmission Corp.—181 miles 26-in., under way, Bastrop to Eunice, La. Houston Contracting Co. (North spread near Beekman, 65 miles south to Grayson, La., W. H. Hayes, supt.; center spread north side of Red River at Pineville, 60 miles north to Grayson, E. C. Norris, supt.; south spread, south side of Red River, 56 miles south to Tepetate field near Eunice. F. A. Silar, supt.).

Texas Gas Transmission Corp.—580 miles 26-in., proposed, Louisiana and Kentucky

Texas-Illinois Natural Gas Pipeline Co.—1,300 miles 30-in., under way, Corpus Christi area to Joliet, Ill.

Texas-Illinois Gas Pipe Line Corp.—300 miles, 30-in., under way; Trinity River to Texarkana; H. C. Price, contractor. C. E. Shivel, spreadman at Carthage; C. R. Ice, spreadman at Nacogdoches.

Texas-Ohio Gas Co.—1,350 miles, 30-in., proposed, Hidalgo County, Texas, through Arkansas, Mississippi, Tennessee, and Kentucky on to Spencer, W. Va.

Union Gas & Electric Co.—35 miles, 8-in Bloomington to Harris, Ill. O. R. Burden contractor. Floyd Lewis, spreadman at Bloomington, Ill., Fall completion date.

Union Oil Co. of California.—40 miles, 8-10-in., planned, San Joaquin Valley and Los Angeles Basin.

United Fuel Gas Co.—32 miles, 20-in., under way, Lanham to Broad Run, W. Va. H. L. Gentry Construction Co., contractor, Frank Morris, spreadman at Charleston, W. Va.

United Gas Pipe Line Corp.—315 miles, 24-30-in., contracted, Agua Dulce to near Goodrich, Tex. Oklahoma Contracting Co., contractor.

United Gas Pipe Line Corp.—53 miles, 24-in., authorized, Texas; 93 miles, 20-24-26-in., authorized, Houston, Beaumont, Orange, Tex.

United Gas Pipe Line Co.—50 miles, 16-in., authorized, Baldwin County, Alabama southeasterly to Escambia County, Florida

United Gas Pipe Line Co.—100 miles, 20-24-26-in., contracted, Near Houma to Franklin, La.; Associated Pipe Line Contractors, Inc.

United Gas Pipe Line Corp.—510 miles, 24-26-30-in., contracted, Agua Dulce, Tex., to Monroe, La.; 233 miles, 20-24-26-30-in., from Pure Oil Co.'s offshore platform Block 32 Eugene Island area to Jackson, Miss., comp. sta.; 60 miles, 12-16-20-in., from Lafayette comp. sta. and Weeks Island field to Franklin, La., to connect with above mentioned 30-in.; 59 miles, 30-in., Jackson comp. sta., Miss., to Texas Eastern Trans Corp.; 124 miles, Sterlington comp. sta near Monroe, La., to Jackson comp. sta., Miss.; 23 miles, 8-12-16-in., South Louisiana

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facilities; all contracted by Gulf Southern Contractors, a joint venture including Texas Louisiana Contractors; Oklahoma Contracting Co.; J. Ray McDermott and Morrison-Knudson. Inspection by Brown & Root, Inc.

United Gas Pipe Line Co.—30-in., contracted, Gonzales, La., to Koscuisko, Miss. River Const. Corp. Completion date 11-51.

United Gas Pipe Line Co.—24-in., contracted, Baxterville, La., to McComb; River Construction Corp. Completion date 11-51.

United Gas Pipe Line Co.—65 miles, 30-in., under way, Gonzales, La., to Koscuisko, Miss. River Const. Corp. Red Tatum, spreadman at Hammond, La. Completion date 11-51.

United Gas Pipe Line Co.—43 miles, 24-in., under way, Baxterville, La., to McComb, Miss. River Const. Corp. Jim Reed, spreadman at Columbia, Miss. Completion date 11-1-51.

United Gas Pipe Line Co.—87 miles, 20-in., under way, State Line to Jackson, Miss. River Const. Corp. Merle Tatum, spreadman at McComb, Miss. Completion date 12-15-51.

U.S.E.D.—18 miles, 8¾-in., contracted, Norwalk to Long Beach, Calif. J. E. Young Pipeline Contractor, Inc.

Utah Natural Gas Co.—**300 miles**, 22-in., proposed, San Juan Basin area to Salt Lake Utah.

Virginia Natural Gas Co.—**183 miles**, Buckingham to Richmond and Portsmouth, Va.

Western Kentucky Gas Co.—2 to 4-in., under way, additions to present system; Modern Welding Co., Inc., contractor.

Western Pipe Lines.—1,200 miles, 22-in., planned, Southern Alberta to Duluth, Minn.

West Texas Gas Co.—27 miles, 10-in., authorized, Lubbock to Abernathy, Tex.

Foreign Crude-Oil Pipe Lines—Planned and Under Way

Alberta Pacific Oil Pipe Line Co. (Brosaw, Dixon, McKee).—**970 miles**, 16-in. proposed, Edmonton south to **Kingsgate**, B. C., to Washington to Vancouver, B. C.

Cia. de Petroleo Ganso Azul, Ltd.—**48 miles**, 4-in., planned, Ganso Azul field to Pucalpa on upper Ucayali River, **Peru**.

Condor S.P.A. (Shell).—**80 miles**, planned, Genoa to Rho, near Milan, Italy.

Direccion General de Yacimientos Petroliferos Fiscales.—409 miles, under way, Plaza Huincul to Bahia Blanca, Argentina.

Independent Pipe Line Co.—721 miles, 16-18-22-in., proposed, Edmonton to Vancouver Spreads as follows: 185 miles of 22-in.; 391 miles, 20-in.; 95 miles, 16-in.; and 30 miles, 18-in.

Iraq Petroleum Co., Ltd.—556 miles, 30-32-in., under way, Kirkuk, Iraq, to Banias, Syria, 1952; Bechtel-Kirkuk, contractor.

Iraq Petroleum Co., Ltd.—72 miles, 12¾-in., Zubair to Fao. Arabian Bechtel Co., contractor. Completion date 12-51.

Middle East Pipelines, Ltd.—800 miles, 34-36-in., planned, Iran to a Levantine port.

Petroleos Mexicanos.—145 miles, 12-in. considered, 18 de Marzo field via Reynosa to Monterrey, Mexico.

Petroleos Mexicanos.—100 miles, planned Isthmus of Tehuantepec, Jose Colomo to El Plan field, Minatitlan.

Shell Caribbean Petroleum Co.—160 miles, 30-in., under way; Palmarejo to terminals on the Paraguana Peninsula (Cardon and Las Piedras, Venezuela), 4-52. Land sections contracted by Williams Brothers, de Venezuela, S. A., Charles P. Williams, manager, Marvin E. Jones, superintendent. Water crossings contracted by Mahoney Contracting Co.

Texas Petroleum Co.—60 miles, 4-6-in., under way, Pto. Nino to La Dorada.

Trans-Mountain Oil Pipe Line Co.—715 miles, proposed, Edmonton, Alta., to Vancouver, B. C. Canadian Bechtel, Ltd., engineers.

Winnipeg Pipe Line Co., Ltd.—75 miles, 10-in., under way, Gretna to Winnipeg, Manitoba; Sparling-Fowler Co., Ltd.

Foreign Products Pipe Lines—Planned and Under Way

Colombia Ministry of Petroleum.—**90 miles**, 6-in., planned, Puerto Berrio to La Dorada, Colombia.

Colombia Ministry of Petroleum.—112 miles, 6-in., contracted, Puerto Berrio to Acededo near Medellin, Colombia. **Carolina** Construction Co.

Colombian Ministry of Petroleum.—78 miles, 4-in., planned, Buena Ventura to Cali, Colombia.

Empresa de Ferrocarriles Ecuatorianos.—90 miles, 4-in., under way, Guayaquil to Palmira, Ecuador. J. A. Jones, contractor; C. R. C. Engineering Co., engineers.

Estrada de Ferro Santos a Jundiai.—**32 miles**, 16-in., under way, Santos to Sao Paulo, Brazil (fuel oil line); Techint, contractor. Completion date 12-51.

Governments of Southern Rhodesia and Portuguese East Africa.—200 miles, considered, Beria, Portuguese Mozambique to Umtali, Southern Rhodesia.

Imperial Oil Co., Ltd.—195 miles, 10-12-in., planned, Sarnia via London, Hamilton to Toronto, Ont., Canada. Comstock Midwestern, Ltd., contractor.

Petrocongo (Sub. Cie. Financiere Belge des Petroles, S. A.).—**225 miles**, considered Ango-Ango to Leopoldville, Belgian Congo.

Petroleos Mexicanos.—155 miles, 10-in. under way, Minatitlan to Salina Cruz, Mexico.

Societe des Transports Petroliers par Pipe Line.—140 miles, 10-in., under way, Le Havre to Paris, France. Entrepose, contractor. Completion date 1952.

State of Cundinamarca, Colombia.—120 miles, 6-in., Puerto Salgar, to Bogota, Colombia; Williams Brothers Corp., David Louthen, manager, Bogota.

Trans-Northern Pipe Line Co.—**400 miles** proposed, Hamilton, Ont., to Toronto, Ont., to Montreal, Que., Canada.

Foreign Natural-Gas Pipe Lines—Planned and Under Way

Azienda Generale Italiana Petroli.—110 miles, 12-14-16-in., planned, Cortemaggiore to Genoa.

Azienda Generale Italiana Petroli.—110 miles, planned, Cortemaggiore to Bologna.

Azienda General Italiana Petroli.—142 miles, 14-16-in., under way, Cortemaggiore to Torino. Completion date 1951.

Canadian Western Natural Gas Co., Ltd.—27 miles, 8-in., under way, Jumping Pound to Exshaw, Alberta. Company crews. Completion date 10-51; 22 miles, 6-in., under way, Exshaw to Banff. Company crews. Completion date 10-51.

Canadian Delhi Oil Co. (Subsidiary Delhi Oil Co.).—2,132 miles, proposed, Alberta Toronto, Montreal.

Direccion General del Gas del Estado.—310 miles, 8-in., under way, Plaza Huincul to Neuquen, Argentina, to the vicinity of General Conesa, Argentina.

Northwest Natural Gas Co.—950 miles, 24-in., planned, Alberta fields to Vancouver, B. C., Seattle, Wash., and Portland, Ore.

Northwestern Utilities, Ltd.—35 miles, 16-in., authorized, Viking to Shonts, Alberta.

Petroleos Mexicanos.—205 miles, 16-in. considered, Monterrey to Torreon, Mexico.

Petroleos Mexicanos.—**260 miles**, **20-in.** under way, Monterrey to Tampico and Poza Rica, Mexico.

Petroleos Mexicanos, Mexican Gas Co., and Industrial Gas Co.—600 miles, planned, Reynosa, Tamaulipas, to Tampico-Poza Rica, Mexico.

Trans-Canada Pipe Lines, Ltd.—Proposed, Alberta to Toronto and Montreal.

Venezuela Atlantic Transmission Corp.—195 miles, 10-12-16-in., under way, El Placer near Las Mercedes, State of Guarico to Caracas, La Guaira, Maracay, and Valencia. Contracted by Williams Brothers, de Venezuela, S. A., B. E. Barnes, manager.

Westcoast Transmission Co., Ltd.—1,110 miles, 24-in., planned, Dawson Creek, B. C., through Pine Pass and Fraser River Valley to Kamloops, Princeton, and Vancouver to Portland. Ford, Bacon, and Davis, engineers.

Westcoast Transmission Co., Ltd.—280 miles, 20-in., planned, Pincher Creek to Montana on to Spokane, Wash. Ford, Bacon, and Davis, engineers.

Western Pipe Lines.—1,200 miles, 22-in., planned, southern Alberta, Winnipeg, to Duluth, Minn.

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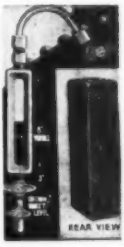

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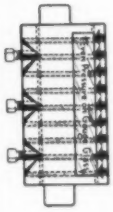

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PIPE LINES

Another Big Line?

New firm plans Texas to West Virginia gas line

WASHINGTON. — Texas - Ohio Gas Co., of Houston, has asked the Federal Power Commission for authority to build a 30-in. natural-gas-transmission line stretching 1,350 miles from Texas to West Virginia.

The company estimated cost of the big project at $184,989,683. It said it has assurance of acquiring natural-gas reserves insuring delivery of a minimum of 330,000,000 cu. ft. per day for 20 years and is in position to acquire soon additional reserves to increase this to 650,000,000 cu. ft.

The big line as proposed would originate in Hidalgo County, Texas, near the Rio Grande River and extend through Arkansas, Mississippi, Tennessee, and Kentucky, terminating near Spencer, W. Va. It would have 13 compressor stations with a total of 140,000 hp.

The project would be built in two phases. The initial phase would carry about 330,000,000 cu. ft. of gas per day to West Virginia. The second phase would increase capacity to about 505,000,000 cu. ft. per day. Ultimate capacity of 650,000,000 cu. ft. per day is contemplated.

Pacific Gas Plans Looping Of Big Line From Arizona

SAN FRANCISCO.—Pacific Gas & Electric Co. has petitioned the California Public Utilities Commission for permission to build 142 miles of natural-gas pipe line paralleling the company's existing 34-in. line from Topock, Ariz., to Milpitas, Calif.

The new line would double existing facilities now bringing gas from New Mexico and West Texas via El Paso Natural Gas Co.'s system to Topock.

The new construction, estimated by company to cost about $19,391,000, also involves enlargement of three compressor stations now under construction in Kings and San Bernardino counties, California, and at Topock.

Pacific's present $64,000,000 line carries 250,000,000 cu. ft. of gas per day.

Texas Pipe Line Announces Large Construction Program

HOUSTON. — Several projects to improve the facilities of the Gulf Coast oil-pipe-line system of Texas Pipe Line Co. were announced last week by R. B. McLaughlin, president. Approval of these projects by the Petroleum Administration for Defense was indicated.

McLaughlin said that a contract would be awarded within 30 days for construction of a 220-mile, 22-in. pipe line between Houma, La., and Port Arthur. The company will also build a new 31-mile, 12¾-in. pipe line from Houma to Cocodrie, La., and a gathering system to serve Bay St. Elaine, Lake Barre, Lake Pelto, and Caillou Island oil fields in the Terrebonne Bay area of Louisiana.

Completion of the 22-in. line is expected by July 1, 1952, McLaughlin said. Completion of this line will provide an outlet for increased production in the four producing fields to

GAS TO BROOKLYN.—Transcontinental is making rapid progress on its 11-mile, 26-in. Staten Island extension from Linden, N. J., to Brooklyn. Here a pipe gang is working on the line in a rural section of Staten Island preparatory to crossing the 6,500-ft. Narrows.

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which the new gathering system will be extended.

Texas Pipe Line Co.'s existing 8 and 10-in. line from Houma to Port Arthur will be extended to Baton Rouge, and converted to a products pipe-line system.

Utah Natural's Prospects For Big Utah Line Brighten

SALT LAKE CITY.—Utah Natural Gas Co.'s prospects for building its planned $32,000,000 gas-transmission line from eastern central Utah gas fields to this city were looking up this week.

Two natural-gas strikes in these fields were reported by Byrd-Frost Co., Inc., of Dallas.

Utah Natural holds a certificate from the Utah Public Service Commission authorizing construction of the line provided sufficient gas reserves are found. Production from both of the discoveries is committed to the proposed line.

The discoveries, in Carbon and Emery counties, flowed 7,500,000 and 3,500,000 cu. ft. per day respectively. Reports said neither well is in the main core yet, and there are possibilities that both may be larger.

Michigan Gas Gets O.K. From FPC for 77-Mile Line

WASHINGTON.—Michigan Gas Utilities Co. has received the green light from the Federal Power Commission here for construction of 77 miles of natural-gas-transmission line from a connection with Panhandle Eastern Pipe Line Co.'s facilities south of Marshall, Mich., to the Sturgis, Hillsdale, and Coldwater area of south central Michigan.

The new system will have an ultimate daily delivery capacity of about 11,200,000 cu. ft. and will cost about $1,500,000.

New Radio Construction Permits Issued by FCC

WASHINGTON.—Construction permits for 4 base stations and 55 mobile units in the petroleum radio service have been issued by the Federal Communications Commission, as follows:

Union Oil Co. of California: 10 additional mobile units to operate in the southern part of California on a frequency of 48.90 mc.

Standard Oil Co. of California: 45 substitute mobile units to operate in the western United States on a frequency of 158.37 mc.

Acme Natural Gas Co.: Base station at Butler, Pa., to operate on 959 mc.

Texas Gas Transmission Corp.: 3 base stations for use in the Central United States along the company's pipe line on a frequency of 48.90 mc.

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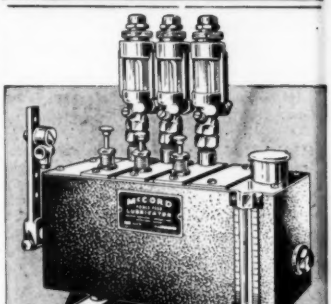

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REFINING

Synthetics Realized

First commercial coal hydrogenation unit o.k.'d

WASHINGTON.—The nation's first commercial plant for the production of chemicals and synthetic petroleum by hydrogenation of coal will be built by Union Carbine & Carbon Corp. at Institute, W. Va.

The $11,000,000 plant, for which a certificate of necessity will be granted by the Defense Production Administration, actually will be little more than a commercial-scale pilot plant for the production of chemicals with synthetic-liquid fuels as a byproduct.

The plant is designed to process about 300 tons of coal per day, with provision for doubling that input, to produce pitch coke, naphthalene, solvent naphtha, coal tars, tar acids, special carbons, light oils, benzene, and toluene.

It is estimated that an output of 1,000 bbl. daily of synthetic-liquid fuels could be developed, however, only 200 bbl. will be produced because of primary production of chemicals.

Announcing the approval of accelerated amortization for the plant, Interior Secretary Oscar L. Chapman characterized it as "a step toward the commercial production of critical aromatic chemicals and gasoline," and said it "should broaden the technical knowledge of the coal-hydrogenation process which is of great importance in the development of a synthetic-fuels industry."

In the light of these views, it is generally considered that the plan to give government encouragement for the building of a $400,000,000 hydrogenation plant has been definitely sidetracked.

Bay Plans Construction of 3,500-Bbl. Fluid Cracker

DENVER. — Bay Petroleum Corp. has secured Petroleum Administration for Defense approval for construction of a 3,500 bbl. per day fluid catalytic cracking unit at its refinery here. Certificate also approved construction of additional tankage and other equipment for the revamping and modernization of the plant.

Contracts have been signed with Procon, Inc., and Universal Oil Products Co. for construction, engineering, and licensing of the facilities. Completion of construction is scheduled for late next year.

New facilities will increase crude throughput from the present 6,000 bbl. to 11,000 bbl. per day. New construction at Bay's Chalmette, La., refinery is scheduled for completion December 1 of this year. Procon has contract for construction there.

Gulf Contracts Big Still

NEW YORK. — Foster Wheeler Corp. has revealed that it has secured a contract from Gulf Oil Corp. for design, engineering, fabrication, and construction of a 125,000-bbl. atmospheric and vacuum-distillation unit at Gulf's Philadelphia refinery.

NELSON REFINERY CONSTRUCTION INDEX

Appears in the first issue of each month.
Explanation—Cost-imating No. 61, December 15, 1949, pages 91, 92.
Compiled by W. L. Nelson—Refinery Consultant—Tulsa.
Indexes of Individual Equipment Items—January, April, July, October.

INDEX (1946 = 100)

	1947	1948	1949	1950	July 1951
Centrifugal pumps	109.0	120.0	118.9	128.1	136.2
Reciprocating pumps	128.5	138.1	144.6	143.9	183.3
Compressor	114.0	128.0	120.0	118.8	138.1
Engines	109.0	120.0	115.6	117.9	137.1
Motors	110.0	112.7	114.0	130.8	148.8
Transformers	116.0	116.0	116.0	116.0	130.5
Instruments	113.0	120.0	122.0	127.8	142.4
Misc. equipment average	114.2	122.1	121.6	126.2	145.2
Materials component	122.4	139.3	143.6	149.5	163.9
Labor component	113.5	128.0	137.1	144.0	153.5
Refinery construction index	117.0	132.5	139.7	146.2	157.7

It will be the largest crude-distillation unit yet constructed. Plans call for completion of the big plant by the summer of 1953.

Maintenance Conference Set

Plans for the third Plant Maintenance Conference, to be held concurrently with the Plant Maintenance Show at Convention Hall in Philadelphia, January 14-17, 1952, will include sessions on maintenance in oil refineries.

In addition, general conferences will be held on such subjects as maintenance costs, planning and scheduling, inspection methods, and records for preventive maintenance, training, supervisors, and lubrication. Two hundred companies have indicated they will display products and services necessary for maintenance.

Refining Briefs

Standard Oil Co. (Ohio) has moved in the first of two fractionating towers for its new $5,500,000 crude-distillation units at the Cleveland No. 1 refinery. The tower, 140 ft. long and 11 ft. in diameter, was built by A. O. Smith Corp., Milwaukee, and shipped to Cleveland on three flat cars.

Fluor Corp., Ltd., has begun work under supervision of Phillips Petroleum Co. engineers on Phillips' new $5,000,000 cracking plant at Okmulgee, Okla. The cracker will enable the refinery to produce about 50 per cent more gasoline and distillates than before. It is expected to be ready to go on stream about next July.

Mexican Petroleum Corp.'s new asphalt plant at Wilmington, N. C., has been dedicated and placed in operation. The new plant, built by American Oil Co., has a daily capacity of 750,000 lb. of asphalt. Gov. W. Kerr Scott of North Carolina dedicated the plant.

Shell Oil Co. dedicated its new marine terminal at Searsport, Maine, last week. The terminal has a pipeline system linking the tanker dock to the plant property and a storage capacity of more than 190,000 bbl. It is estimated that about 600,000 bbl. of products will move through the terminal yearly.

Gulf Oil Corp. has revealed plans for construction of a new blending and packaging plant at Cincinnati. Sidney A. Swensrud, president, said the plant will service an area covering Ohio, Indiana, Illinois, Michigan, and Kentucky. This area at present is serviced by packaging plants at Gulf's Port Arthur and Philadelphia refineries.

Publicly reported cash dividends paid by oil-refining corporations in August were only $3,900,000, compared with $9,900,000 in the same month last year, according to Commerce Department statistics. Payments for the first 8 months of the year, however, were $407,100,000 against $348,600,000 in the same 1950 period.

As part of an A.S.T.M. meeting of Committee D-9 on Electrical Insulating Materials, a symposium on uninhibited petroleum electrical-insulating oils will be held November 14 at Niagara Falls, Ont. This fourth symposium on the subject will be based on the results of a cooperative study on the correlation of laboratory tests with service performance.

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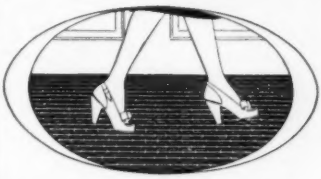

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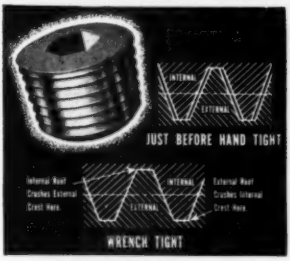

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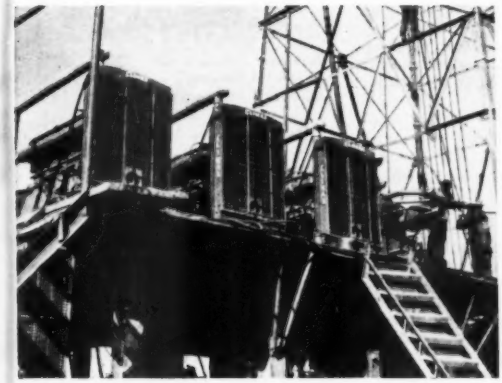

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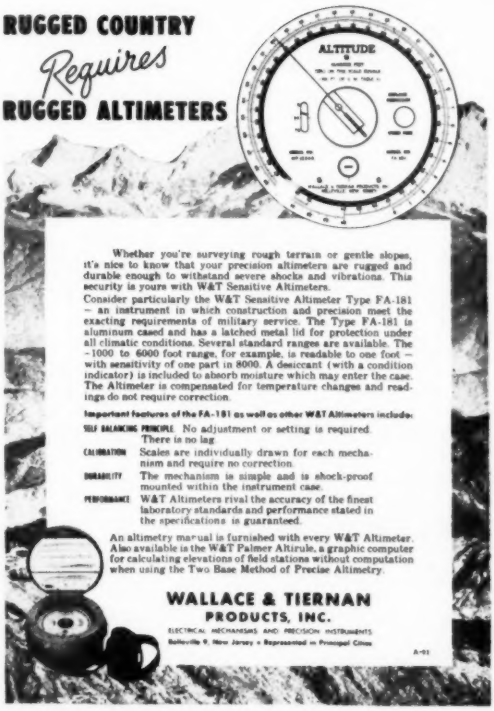

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Among the Drilling Contractors

Pike Elevates Simpson To Vice Presidency Job

Two changes in executive personnel of Thomas P. Pike Drilling Co., Los Angeles, have been announced by Stanwood I. Williams, executive vice president.

Clyde R. Simpson, assistant to A. S. Hayes, vice president, has been elevated to the post of vice president in charge of contracts.

John F. Tolton, formerly assistant trust officer, Security First National Bank, Los Angeles, has joined the drilling corporation as secretary.

Simpson has been with the Pike organization since 1947. He has been associated with the petroleum industry since his graduation from Stanford University in 1935.

Recent changes in operating personnel of the organization include the promotion of Perry Isham from head mechanic to superintendent of equipment maintenance, and Gerald Robertson, V. L. Parker, and Earl Pugh from drillers to tool pushers.

Denver Office Opened

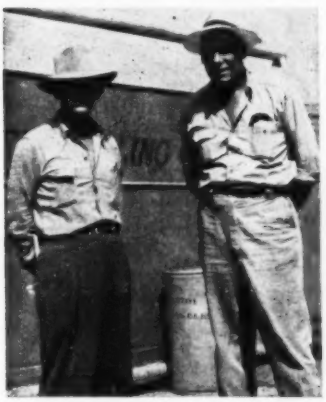
Tuley & Carter Drilling Co., Evansville, Ind., has established a branch office at Denver with a view toward entering the active exploratory and development play under way in the Denver-Julesburg basin. The company has acquired a new 10,000-ft. capacity rotary rig, which will be operated in that area. The company is owned by Bob Tuley and John Carter.

Trident Buys Two Rigs

Trident Drilling Co., Calgary, Alta., has acquired two additional rigs, making a total of six rigs the company will operate in western Canada. One of the new acquisitions, now en route from Houston, has a rated depth capacity of 8,500 ft. The other, rated at 6,500 ft., was purchased from Okalta Oils, Ltd., at Calgary. Trident is a comparatively new company, principal shareholder of which is Selburn Oil Co.

New Drilling Company

Clark & Fuson Drilling Co., Inc., is a newly formed contracting and operating organization with headquarters at Alice, Tex. Principal owners are E. B. Clark, Lee Roy Fuson, and Goodhue Weatherly.



Joe Blanchard (left) and Bob Weigelt, San Joaquin Valley superintendent and tool pusher, respectively, for Santa Fe Springs Drilling Co., which drilled Humble Oil & Refining Co.'s recently completed oil discovery well 2 miles east of the Greely field, Kern County, California. The rig now is drilling for Humble at a location 2/3 mile northeast of the discovery producer.

Jones - Shelburne, Inc., Oklahoma City, has taken on a job of reworking an old dry hole, located on the north edge of the Coyle townsite, Logan County, Oklahoma. Its contract is with Smith & Cleary, Inc. The test is 1 Cohee, SE NE SW 7-17n-1e. Hole, originally drilled to below 5,200 ft., will be cleaned out to below 4,950 ft., where it is planned to run casing and test Bartlesville sand.

Long Horn Drilling Corp., San Antonio and Three Rivers, Tex., is starting work on two new contract jobs. One is a wildcat test for Sunray Oil Corp. in northeastern Live Oak County, South Texas. It is 1 W. A. Smith in the T. B. Reese Survey. Contract is for 7,700 ft. The other is for a 9,000-ft. test for Western Natural Gas Co. in the St. Charles field, Aransas County, Texas Gulf Coast. The latter is the operator's 15 St. Charles Ranch.

E. L. Oliver, Oklahoma City, is drilling for Joe Ray at 1 Bushnell, NW SW SE 7-5n-8w, a newly started operation on the east flank of the Cement field, Grady County, Oklahoma. Hole is projected to 3,500 ft. but may be carried to 4,500 ft.

Davis & Wharton Drilling & Production Co., Oklahoma City, has two new contract jobs under way. One is a projected 6,400-ft. test being

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drilled for United Transport Co. and C. E. McCaughey in the Navina area, southwest of Guthrie, Logan County, Oklahoma. It is 1 Cornforth, NE NW SW 17-15n-3w. The other is a well in the West Uncas area, Kay County, being drilled for Amos & Friedman. The latter, 1 Martin, SW SE NW 34-27n-3e, revives development in an abandoned productive area.

Dorris Ballew, Inc., Natchez, Miss., has operations under way at a Cities Service Oil Co. wildcat test a mile west of Seminary, Covington County, Mississippi. The test is 1 Bullock with location in the C SW SW 28-7n-14w.

Rex Drilling Co., Inc., Shreveport, is starting on a 11,000-ft. contract with Gulf Refining Co. at the latter's 1 Walker Unit, a wildcat in the C NW SE 8-7n-9e, 2½ miles north of Fair Oak Springs, Lincoln County, Mississippi.

Pabco Drilling, Inc., Wichita, is the contractor on a wildcat test which Globe Oil & Refining Co. is starting in northwestern Gove County, western Kansas. Location is on the operator's Wolfe lease, in the NE NE NE 27-21-31, 18 miles northwest of the Coberly pool, nearest production.

Austin Dunham Co., Seminole, Okla., contracting for Porter Oil & Gas Co. of Oklahoma City, has a projected 4,250-ft. wildcat test under way in the area 7 miles east of Marland, in Noble County, Oklahoma. The test is the operator's 1 Springfield, in the SE SE NW 19-24n-3e.

Clark Drilling Co. has a rig running for Utah Southern Oil Co. at a wildcat location in the Rozell area, Boxelder County, Utah. Operation is at 1 Bar B, SW SW NE 17-10n-7w.

Kendrick Drilling Co. is the contractor on a 3,000-ft. test projected by Joe Lazarov and Robert Robilio at a wildcat location 4 miles southwest of the Bull Bayou field, DeSoto Parish, Louisiana. Location is for 1 Franklin, in 6-11n-12w.

ACTIVE ROTARY RIGS*

(United States and Western Canada)

Area	Week ended 10-22-51	Change week ended 10-15-51	Change week ended 10-23-50
Gulf Coast	630	+13	+ 71
W. Tex.-N. M.	1,041	+35	+226
Ark.-N. La.-E. Tex.	181	+10	+ 32
Oklahoma	335	—10	+ 40
Kansas-S. Nebraska	195	+ 6	+ 54
Illinois-Eastern	153	— 3	— 9
Rocky Mountains	201	— 8	+ 75
Pacific Coast	180	— 5	+ 42
Total U. S.	2,916	+38	+531
Western Canada	167	+ 2	+ 56
Total	3,083	+40	+587

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States and the Rocky Mountain and western Canada areas are shown on pages 118 and 119.

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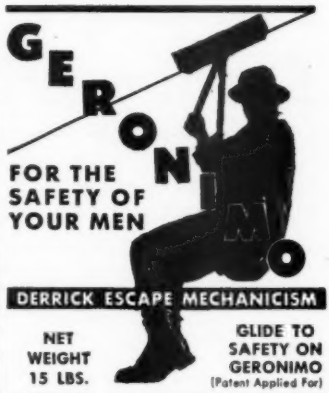

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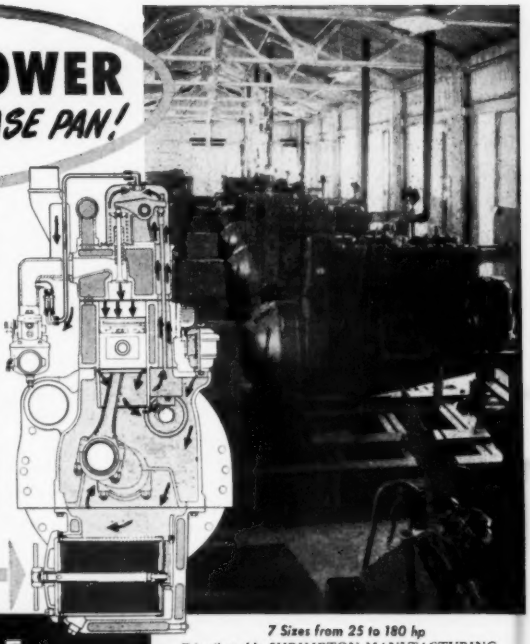

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NATURAL GAS

California Firms Expanding To Handle Ventura Gas Flow

LOS ANGELES.—Southern California and Southern Counties Gas Cos. are expanding pumping facilities to handle additional volumes of gas from increased production in Ventura Avenue field north of Los Angeles.

In 1950 delivery of natural gas from the Ventura field averaged 76.2 million cubic feet a day. First indication of the increased production came in June when the expected delivery of 81.3 million cubic feet rose to an actual 88.9 million cubic feet per day.

In July the expected delivery of 81.5 million cubic feet climbed to an average of 88.4 and in August the expected delivery of 81.8 soared to 92.7. By 1955 it is estimated the daily delivery will reach 110.7 million cubic feet.

The local gas companies will install a 400-hp. compressor at Ventura Station No. 50 to handle part of the increased volume of gas from the Ventura area. Cost of the project is set at $71,500. Plans are also being made to meet future increases in delivery volumes.

Long Beach Studies Report Favoring Storage Project

LONG BEACH, Calif.—This city's harbor commission is studying a report prepared by John Dodge, geologist, recommending installation by the city of an underground-storage project for conservation of casing-head gas.

Dodge proposed that the initial project involve storing gas in 5-B Lower Terminal pool. However, M. D. Hughes, chief petroleum engineer for the harbor department, asked the commission to approve studies of other pools.

The study estimated cost of storage at 5 cents per M.c.f. and cost of installation at less than $1,000,000. It also said it was possible for 100 per cent of injected gas to be recovered.

In addition, Dodge said, a properly executed pressure-maintenance program not only would conserve gas for future use but would increase oil recovery in the 5-B Terminal zone by 10 per cent.

1950 Marketed Production Passes 6 Billion M.c.f.

WASHINGTON. — Marketed production of natural gas last year passed the 6 trillion cubic foot mark going away.

Bureau of Mines figures showed that production during 1950 totaled more than 6.282 trillion compared with about 5.420 trillion in 1949.

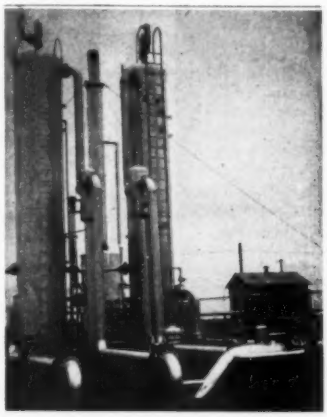
Most producing states showed gains with Texas, Louisiana, and Kansas showing the way. Mississippi increased its marketed gas production 68 per cent, and Maryland produced marketable quantities of gas for the first time.

Gross gas placed in underground storage stood at almost 230 billion cubic feet compared with about 172 billion in 1949. Total consumption, increasing in every consuming state, jumped to 6.027 billion cubic feet from 5.196. Texas, Ohio, and California showed the biggest gains.

Michigan Gas Buys Leases For New Storage Project

JACKSON, Mich. — Michigan Gas Storage Co. of this city is purchasing lease rights preparatory to constructing an underground natural-gas-storage project in old Riverside gas field, Missaukee County, Michigan. The firm plans to place the project in operation to receive gas for storage by the summer of 1952. Contemplated deliverability at maximum pressure of 430 psig. would be 50,000 M.c.f.

Riverside gas field lies in the Michigan (Mississippian) Stray sand found at a depth of 1,400 ft. Of the original capacity of 7,500,000 M.c.f., a permanent cushion of 6,000,000 M.c.f. of gas would be employed, leaving available for storage and withdrawal service 1,500,000 M.c.f.



NEW DEHYDRATOR.—Dehydrator installation of Consolidated Gas Utilities Co. in Elk City field, Beckham and Washita counties, Oklahoma. The unit currently receives 20,000,000 M.c.f. of residue gas from the Elk City plant of Shell Oil Co., operator for nine other companies.

Average bottom-hole pressure as of December 31, 1950, in the Michigan sand reservoir was 182 psig. Operators plan to develop facility wells and boost pressures to an operating level of between 375 to 430 psig.

August Sales Up 17.1 Per Cent Over August 1950

WASHINGTON.—Sales of natural gas during August totaled 3.054 billion therms, gaining 17.1 per cent over the 2.609 billion therms sold in August 1950, according to the American Gas Association.

The percentage increase in sales for the year ended this August over the year ended August 1950 was 16.7.

Operating revenues of natural-gas companies reporting to the Federal Power Commission totaled $97,348,337 in August, up 17.2 per cent over August 1950.

Natural Gasoline

Gulf Reveals Plans for New Crane County Plant

FORT WORTH. — Gulf Oil Corp will build a sulfur-recovery unit at its Waddell natural-gasoline plant in Crane County, West Texas, starting in December. Announcement of the new unit came after Gulf revealed plans earlier in the week for a similar plant at its big Port Arthur, Tex., refinery.

The Waddell unit will produce about 20 tons of sulfur a day from hydrogen sulfide removed from gas as waste. The unit is expected to go into operation February 1, 1952.

Waddell plant is processing about 38,000,000 cu. ft. of casing-head gas per day from which it produces about 45,000 gal. of natural gasoline, 17,000 gal. of butane, and 20,000 gal. of propane.

Phillips Clearing Site For New Spraberry Plant

MIDLAND, Tex. — Phillips Petroleum Co. has started clearing site preparatory to beginning construction of its multimillion-dollar Spraberry natural-gasoline plant 22 miles southeast of here.

Necessary approval for acquisition of required materials for the plant has been received from the Petroleum Administration for Defense, surveys for pipe lines and other field facilities made, and necessary equipment purchased.

The plant will process more than 100,000,000 cu. ft. of Spraberry gas per day from the Tex Harvey, Germania, and Driver areas in Midland and Glasscock counties. Phillips plans future expansion of the plant to handle additional gas as the big Spraberry play continues.

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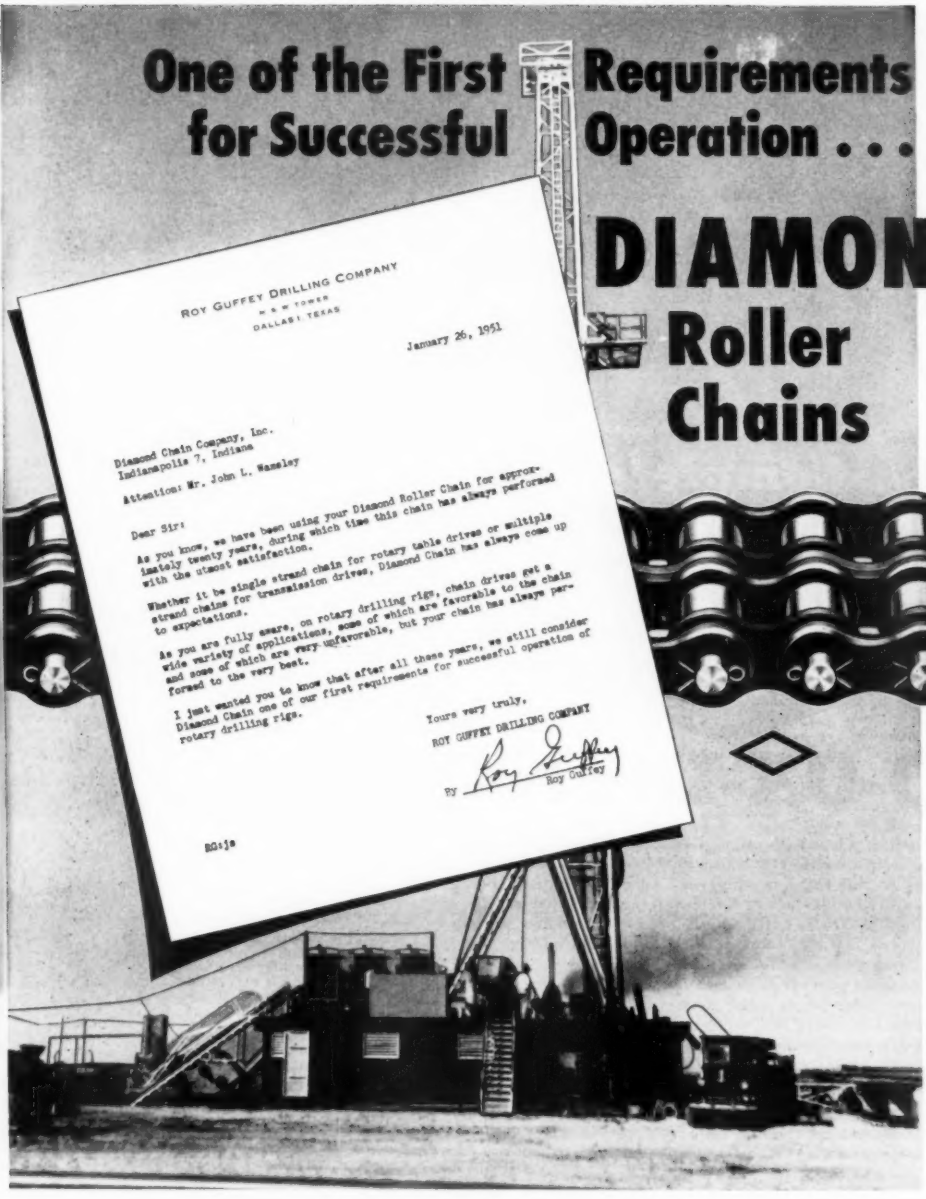
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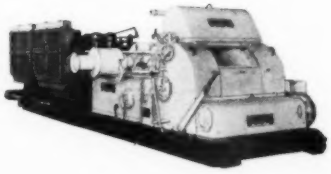

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Growth of Williston Basin Activity

SINCE the discovery of oil by Amerada Petroleum Corp.'s deep test in the heart of the Williston basin last April, the volume and intensity of exploratory activity throughout this broad sedimentary unit have been just short of miraculous. It was but a short time ago that this area was considered to be too far from markets, to have its reservoir rocks too deep, and to be too difficult to explore to be slated for near-future development.

Williston basin activity was last reviewed on this page June 14. At that time there were 10 active wildcats. Today there are more than twice that many. At that time Amerada's indicated discovery was the only significant proof of the basin's potentialities. To date 8 out of 13 wildcats that have dug below 5,000 ft. have found indications of oil in commercial or possibly commercial quantities in four or five distinct ages of rocks. Though the Williston basin has not yet been proved as an important oil-producing province, it appears more and more likely that the not-too-distant future may find it one.

It is not only the number of active wildcats that indicate the intensity of exploratory interest in the Williston basin. Geophysical activity, often a better yardstick of what the future has in store for an area, is booming. Look at the map on page 65 for a recent picture of geophysical activity in this hard-to-work basin.

The Williston basin is an excellent example of what Wallace E. Pratt was talking about at Austin a week or so ago in his "Philosophy of Oil Finding" when he said that oil finders must not let what they know keep them from being constantly alert to what they do not know about the occurrences of oil. Here is a basin that was rated by some as having poor prospects for discoveries. It was said that the basin was not conducive to the generation of oil (though no one has yet proved just what is conducive to the generation of oil) because it was too big, too inactive, and because sedimentation was too gradual.

With these ideas in mind plus the records of a very few deep, scientifically located tests that were completed dry, some 100,000 cubic miles of sedimentary rock were looked upon by these students as not being a particularly promising place to look for oil. Not everyone thought this though, or activity could not have built up as rapidly as it did. Obviously Amerada expected to find oil or it wouldn't have kept drilling long after many had written off the test as "another dry hole in North Dakota." Amerada did as Pratt suggested that all oil finders do—consider any area as potential until it is definitely proven barren. Amerada's deep test was not drilled in an entirely untested portion of this vast basin—it was located only 6 miles from a hole that went to 10,000 ft. before being completed dry.

Here is a a thumbnail sketch of developments in the Williston area (see map):

(A) Sohio Oil Co. 1 Wood Mountain, below 7,279 ft. (B) Shell Oil Co. 1 Dahinda, bailed 25 bbl. of oil daily at 4,700 ft., now below 7,000 ft. (C) Shell 1 Big Muddy Lake, found some oil in Devonian at 8,000 ft., now below 10,000 ft. (D) Carter Oil Co. 1 West Poplar unit is an old dry hole being deepened from 5,055 ft. (E) C. H. Murphy 1 Poplar unit, below 5,600 ft., recovered 3,200 ft. of Madison oil on drill-stem test at 5,665 ft.

(F) Shell 1 NPRR, first indicated discovery of oil in Montana Williston basin (flowed oil from Charles at 7,200 ft.), below 10,300 ft. (G) The Texas Co. 1 NPRR, below 8,768 ft. (H) Shell 1 Pine unit, recovered 300 ft. of oil from basal Devonian or upper Ordovician at 9,000 ft., now below 9,343 ft. (I) Mon-o-co 1 State, standing at 2,012 ft. (J) Texas Pacific Coal & Oil Co.-Pure Oil Co. 1 Cox, below 8,303 ft. (K) James P. Owen 1 Estevan, below 4,400 ft. (L) Amerada 1 Bakken, flowed oil on test of Madison (?) at 8,300 ft., now below 10,162 ft.

At arrowed dot: North Dakota's oil well, Amerada 1 Iverson, producing from Devonian at 10,500 ft.; Amerada 1 Dilland, 1 mile north of discovery well, flowed up to 50 bbl. hourly in extended tests between 8,396-8,518 ft.; Rudman & Parsons 1 Iverson, 1 mile south of discovery, below 8,000 ft.

(M) Amerada 1 Risser, below 9,393 ft. (N) Shell 1 Homme, below 9,307 ft., nearing granite. (O) S. E. Pohle Enterprises 1 State, below 4,740 ft. (P) Lakota Petroleum Corp. 1 Houghon, below 250 ft. (Q) California-Standard Co.'s three producing wells in Mississippian pinchout area. (R) The California Co. 1 Thompson, below 3,910 ft. (S) H. L. Hunt's first of three scheduled strat tests in Bottineau County. (T) Smith & Curran 1 fee, preparing to spud.

Philip C. Ingalls.

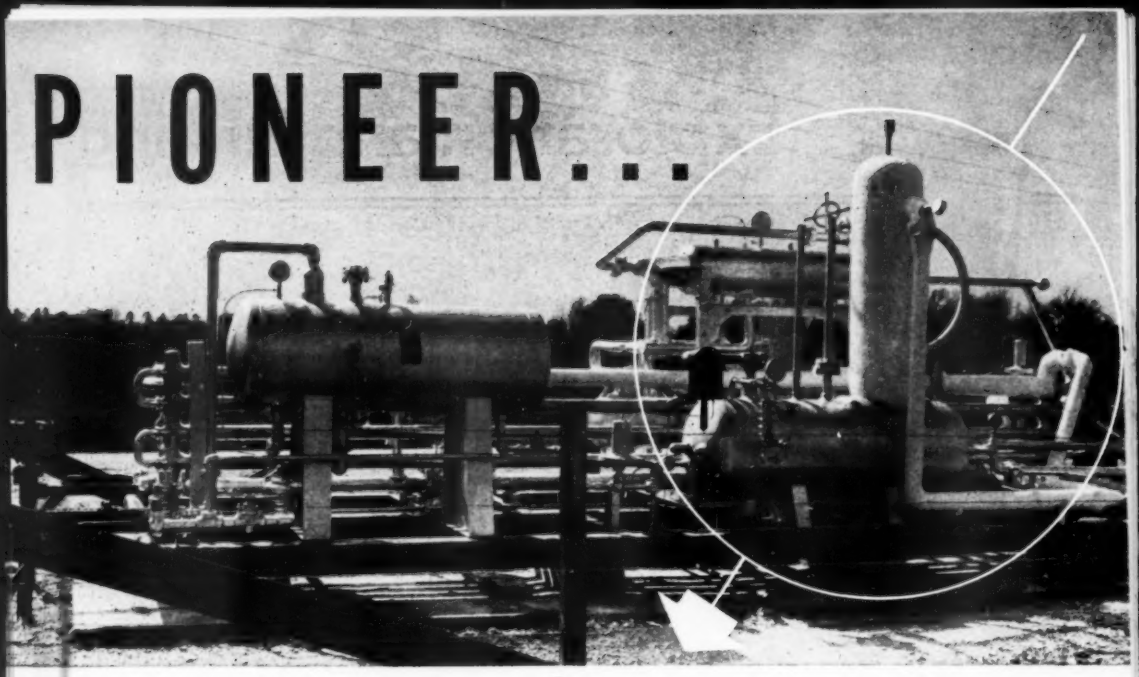
HIGHLIGHTS OF WEEK'S DEVELOPMENTS

WEST TEXAS.—American Viking Corp. 1 McCaughey extended Pennsylvanian production about 1 mile northwest of Parks field. Potential was 262.7 bbl. of 45°-gravity oil through 16/64-in. choke. Stanolind 1-B Proctor had Clear Fork oil in Four Corner Spraberry field of Reagan, Glasscock, Upton and Midland counties. Drill-stem test at 6,330-6,420 ft. had hole full of clean oil in 2 hours.

NORTH TEXAS.—Becker and Sloss 1 Anna Mae Hutchinson, Haskell County wildcat 4 miles north of Judd, flowed oil at the rate of 70 bbl. an hour from sand at 4,974-95 ft. Pay section is Strawn, known locally as Judd sand.

SOUTHWEST TEXAS.—O Neathery, Jr., 1 N. C. Stulting, Wilcox oil sand discovery 3 miles west of Ottine production in Gonzales County, is flowing several barrels of oil per hour from gravel-packed open hole at 2,036-46 ft. Sand is thought to be the Carrizo or Arnim. The opening of this oil region has spurred DeLange and Neathery to stake 12 new locations in the immediate area.

PIONEER...



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Kansas

Oil Showings Tested in Three Graham Wildcats

OPENING of three new pools is in prospect in western and central Graham County. Most promising discovery of the three is that made by Prime Drilling Co. and associates at their 1 Stober, a rank wildcat in the SW SW NW 1-9-25, in the extreme western part of the county, where more than 2,000 ft. of clean 38°-gravity oil was recovered in a drill-stem test in the Lansing-Kansas City formation.

Ten miles to the northeast, 3 miles southwest of Hill City, in the central part of the county, Peel & Hardman recovered 70 ft. of oil and 30 ft. of muddy oil in a drill-stem test in the same formation. Three miles northeast of High City and 6 miles northeast of the Peel & Hardman wildcat, Morris Sitran and Murfin Drilling Co. 1 Morris, SE SE SE 32-7-22, got 440 ft. of oil-cut mud with 240 ft. of water in a drill-stem test, also in the Lansing-Kansas City.

Prime Drilling Co.'s test, open 60 minutes, was in a zone at 4,002-21 ft. A previous test higher in the section at 3,912-36 ft. got 60 ft. of oil and water-cut mud with 90 ft. of water. Hole was deepened to 4,058 ft., and following another test, taking in an interval below 4,028 ft., which did not show, casing was run. Top of the Lansing was logged at 3,838 ft. (—1,316 ft.) This discovery is more than 7 miles from nearest other production.

The Peel & Hardman wildcat tested an interval at 3,706-16 ft. with top of the zone at 3,572 ft. (—1,326 ft.). It is being deepened to the Arbuckle, going out of the Kansas City section at 3,795 ft. It is 3 miles from other production.

The test in the Sitran and Murfin wildcat, located 4 miles from nearest production, took in an interval at 3,644-63 ft.

Another new discovery appears to have been made in southern Barton County, where Grant Oil Co. found good saturation in Arbuckle lime at its 1 Harrison, NW NW NW 18-20-13. Arbuckle was checked first at 3,501 ft. (—1,619 ft.). Hotary hole was drilled to 3,550 ft., where a drill-stem test was made, taking in an interval below 3,517 ft. and recovering 430 ft. of oil, 240 ft. of oil-cut mud, and 30 ft. of gas-cut mud. Operators have run their oil string to 3,519 ft. Location is 3 miles southwest of Great Bend and 3 miles from other production, nearest being in the Hiss pool to the north.

KANSAS SUCCESSFUL WILDCATS

Barton County: Anschutz 1 Fleming, SW SW NE 36-16s-14w, pumped 203 bbl. oil from Lansing at 3,353-58 ft., TD 3,467 ft., new pay in Barrett.

The Texas Co. 2 Pritchard, NE NW SE 34-20s-14w, pumped 65 bbl. oil from Simpson at 3,525-29 ft., TD 3,564 ft., old Arbuckle producer worked over, new pay in Pritchard.

Ash 4 Musenberg "B," SE NW NW 10-19s-11w, flowed 450 bbl. oil from Lansing-Kansas City at 3,084-09 ft., TD 3,383 ft., old Arbuckle producer worked over.

Greenwood County: Jones 1 Mansfield, SW SW NE 13-24s-9e, 40 bbl. oil from Bartlesville at 2,299-2,320 ft., TD; extension to Thrall-Agard.

Rooks County: Sidey 1 Stamper, SW SW NE 19-8s-17w, pumped 277 bbl. oil from Arbuckle at 3,400-02 ft., TD.

Trego County: Peel-Hardman 1 Lang, SE SE SE 32-12s-21w, pumped 71 bbl. oil from Arbuckle at 3,905-11 ft., TD 3,951 ft.

KANSAS WILDCAT FAILURES

Barton County: Harms & Knight 1 Slentz, CSL NW NE 27-19s-13w, dry, TD 3,447 ft.

Tatlock 1 Rudiger, NW NW SW 30-19s-14w, dry, TD 3,620 ft.

Butler County: Braden 1 Blood, NE SE SE 17-29s-6e, dry, TD 2,837 ft.

Richland-Welsh & Olson 1 Price, SW NE NE 20-29s-6e, dry, TD 2,837 ft.

Edwards County: Sinclair 1 Mellor, SW SW SE 28-26s-16w, dry, TD 4,900 ft.

Ellis County: Lee Phillips 1 Jacobs, NW NW SW 26-11s-18w, dry, TD 3,775 ft.

Zoller 1 Jensen, NE NE NW 36-11s-19w, dry, TD 3,740 ft.

Zoller 1 Baker, NW NW NW 15-12s-18w, dry, TD 3,750 ft.

Coppinger 1 Schmidt, SW SW SW 21-15s-19w, dry, TD 3,736 ft.

Graham County: Shields & Strain 1 Harrold, NE SE SW 29-9s-21w, dry, TD 3,944 ft.

Pawnee County: Schermerhorn 1 Yeager, SE SE SE 6-22s-15w, dry, TD 3,948 ft.

Rush County: Solar 1 Sutton, SE SE SE 27-17s-20w, dry, TD 4,150 ft.

Russell County: Sitrin 1 Dietz, SE SE SW 28-15s-14w, dry, TD 3,420 ft.

Sedgwick County: Bankhoff 1 Rosenhagen, SE SE SE 21-27s-4w, dry, TD 4,165 ft.

Stafford County: Bay 1 Weirauch, SW SW SW 17-21s-14w, dry, TD 3,762 ft.

Petroleum, Inc., 1 Russell "B," NE SE SW 20-21s-14w, dry, TD 3,821 ft.

Murfin 1 Dale "B," SE SE NE 9-23s-12w, dry, 3,770 ft.

South Louisiana

Iberville Parish Wildcat Finds Salt Dome Production

NEW ORLEANS.—A new oil discovery has been completed on the east flank of Bayou Bouillon salt dome in Iberville Parish at Glassell & Glassell 1 A. M. Cotten, et al, 47-9s-9e. From perforations at 8,780-8,816 ft., the well flowed 161 bbl. of 26.3°-gravity oil daily through 8/64-in. choke

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The nearest production to this new discovery is approximately 6 miles to the north at Bayou de Glaise. Tubing pressure was 1,025 psi. and gas-oil ratio 316:1.

Final completion has been made on a Cameron Parish gas-condensate discovery. Pan American Production Co. 1 Miami Corp., 4-15s-3w, located 2 miles southeast of Pecan Lake field. Through perforations at 12,362-72 ft., the well flowed 130 bbl. of 46.1°-gravity condensate plus 4,954,000 cu. ft. of gas daily. Gage was made through 18/64-in. choke. Tubing pressure on the test was 3,500 psi., and casing pressure 350 psi.

In Terrebonne Parish, Humble Oil & Refining Co. 1 L. L. & E. "D," wildcat in the Bayou Jean La Croix area, has run electric log. An oil sand was indicated at 11,458-68 ft., a gas sand at 12,159-80 ft., and another oil sand at 12,811-45 ft. Venture has 7-in. casing set at 12,159 ft. It is now drilling ahead toward contract depth of 14,000 ft. before testing operations get under way.

Testing operations are under way at Sinclair Oil & Gas Co. 1 Turner Lumber Co., 29-2s-6e, Avoyelles Parish wildcat near Woodside. Operator drilled the well to 12,809 ft. and ran electric log to that depth. Exact depth of the perforations was not disclosed, but it is reported that oil shows were cored around 11,600-11,700 ft.

East of Sunshine field, Iberville Parish, Sohio Petroleum Co. has abandoned 1 Slaughter-Christian, 12-9s-13e, at total depth of 11,505 ft. Operators perforated 10,334-37 ft. for the test. Recovery was a slight blow and water cushion.

SOUTH LOUISIANA WILDCAT FAILURES

Avoyelles Parish: Hunt Oil Co. 3 Chas. B. Peterson, et al, 36-4n-5e, dry, TD 504 ft.

Cameron Parish: Callery & Hurt 1 Miami Corp., 2-15s-3w, dry, TD 12,446 ft.

Iberia Parish: The California Co. 1 Dr. Paul A. Lebourgeois, et al, 14-12s-10e, dry, TD 11,713 ft.

Plaquemines Parish: Gulf Refining Co. 1 Louisiana State 1873, 23-21e, dry, TD 1,261 ft.

St. Landry Parish: Sun Oil Co. 1 Triplette, et al, Unit, 20-4s-7e, Melville area, dry, TD 9,000 ft.

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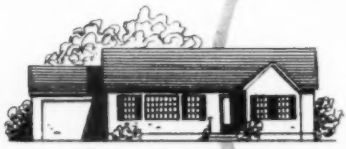

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California

Active Exploration Going On in San Joaquin Valley

LOS ANGELES.—Exploratory activity on the southeastern end of San Joaquin Valley was the principal center of interest in California, recent 6,000-ft. discoveries were attracting particular interest.

A new field discovery was given the McKittrick area and Fruitvale field was given a ½-mile southwest extension. In the northern part of the valley a link well midway between the discovery well of Camden field and a 1¼-mile northwest extensioner was successfully completed.

At the North Arvin area, discovered by The Texas Co. 1 George in mid-July, the company was running an oil string on a southeast offset and, at a 1-mile northwest stepout, was making formation tests after running an electric survey. The latter, 1 Kern Valley in SE NE Section 15-31s-29e, was given a formation test at 6,290-6,330 ft. after drilling and coring to 6,452 ft. Because of tool plugging this test reportedly was a failure. At last reports a second test was being made at 6,333-6,452 ft. At the southeast offset, 2 George, hole was bottomed at 6,511 ft., and 7-in. casing was being run.

The new field discovery was E. A. Bender et al 1 Anderson in SE NE Section 15-30s-21e, about 1 mile west of the northwest end of the old McKittrick field. It was completed in the Phacoides sand through perforations at 4,605-30 ft. for a flow in excess of 500 bbl. daily of 33°-gravity crude.

About ¾ mile northeast of the Rosedale discovery, completed a month ago by Humble Oil & Refining Co. as a new Stevens sand field opener, Humble was coring ahead after running a formation test at 5,933-84 ft. During a 1½-hour test, during which mud reached the surface after about 1 hour, the well flowed some 8 bbl. of mud, of which 2 bbl. were heavily cut with oil. At last reports the wildcat, located in SE SE Section 10-29s-26e, was drilling ahead at 6,355 ft.

CALIFORNIA SUCCESSFUL WILDCATS

Fresno County, ½-mile northwest extension to Camden field: Universal Consolidated Oil Co. 18-5 McVicar, SW SW 5-17s-20e, IP flowed 40 bbl. oil per day, perfs. 6,117-22 ft., 33° gravity, TD 6,250 ft., elev. 372 ft.

Kern County, ½-mile southwest extension to Fruitvale field: Stansbury, Inc., 56-28 "Well," NW SE 28-29s-27e, IP pumped 300 bbl. oil per day, perf. 4,260-98 ft., 21° gravity, clean, TD 4,301 ft., elev. 397 ft.

CALIFORNIA UNSUCCESSFUL WILDCATS

Fresno County, Camden area: Cleveland Oil Co. 1 Reid, 6-17s-20e, dry, TD 6,250 ft., elev. 242 ft.

Kern County, Edison area: Rothschild Oil Co. 17-5 Porter, 17-30s-29e, dry, Jeppi zone, 3,415 ft., Santa Margarita 3,718 ft., TD 3,732 ft., elev. 490 ft.

South Dome area: Capital Co. 16-8 "Well," 8-25s-20e, dry, TD 6,460 ft., elev. 335 ft.

San Emidio Front area: Richfield Oil Corp. 84-28 San Emidio A, 28-11n-22w, dry, TD 7,205 ft., elev. 1,041 ft.

Santos Creek area: E. T. Willard 2 Santos-E. T. Willard, 32-28s-20e, dry, Buttonbed sand 565 ft., TD 971 ft., elev. 1,350 ft.

Los Angeles County, Loma Verde area: Trigood Oil Co. 2 Ayala, 29-5n-17w, dry, TD 8,401 ft., elev. 1,481 ft.

Puente Nose area: The Texas Co. 1 Mc-

Ginnis, 31-1s-10w, dry, TD 7,589 ft., elev. 310 ft.

San Luis Obispo County, Paso Robles area: Macson Oil Co. 1 Linn, 5-26s-12e, dry, TD 2,669 ft., elev. 775 ft.

San Mateo County, La Honda area: Richfield Oil Corp. 1 Isenberg, 12-7s-4w, dry, TD 4,699 ft., elev. 2,291 ft.

Ventura County, Bardsdale area: Shell Oil Co. 2 Dryden, 7-3n-19w, dry, TD 14,154 ft., elev. 724 ft.

Mississippi

Adams County Wildcat May Be New Wilcox Discovery

JACKSON.—A potential Wilcox discovery for Adams County is Magnolia Petroleum Co.'s 1 Netterville-Kendall Unit, 12-5n-1w, approximately 2 miles northeast of Kingston field.

A core was cut at 6,498-6,502 ft. which showed good permeable oil sand. On 17-minute drill-stem test at 6,479-6,502 ft. gas reached the surface in 16 minutes, and top pressure reached 31 psi. Another core was cut at 6,502-05 ft. with recovery being 2 in. of shale, 4 in. of oil sand and 6-in. of sandy shale.

At last report, operator was drilling ahead at 7,004 ft. on a 7,500-ft. contract. Top of the oil sand was called at 6,497 ft., and operators feel assured of at least 5 ft. of oil sand. Dry holes are located 2,200 ft. to the southwest, 3,300 ft. northwest, and 6,000 ft. east of this wildcat.

It is reported that Lion Oil Co. 1 U.S.A., Franklin County wildcat located 4 miles northeast of the Freeswood field, had top of Wilcox at 4,536 ft., and base Big Shale at 5,826 ft. Oil sand was reported at 4,773-76 ft. and 6,465-74 ft. Casing has been run in the well, and it is reported that mechanical difficulties have delayed production tests.

Barnett Serio 1 McGehee-McGehee & Ford, 30-5n-3w, Adams County wildcat, had good show of oil based on side-wall samples in the Wilcox, and operator is preparing to conduct drill-stem test. The oil show was indicated at 6,561-65 ft. A sample at 6,565 ft. was sand with odor and slight golden fluorescence.

In Perry County, Union Producing Co. 1 Hinton, 30-4n-9w, confirmation test to the Glazier field discovery, is coring ahead. Continuous cores were cut from 8,090-8,135 ft. with recovery being interbedded sandy shale and tight sand with no shows. This test is located to try to find thick Lower Tuscaloosa sands next to the dome.

In Mobile Bay, off Baldwin County, Alabama, Gulf Refining Co. has begun drilling the first test in the bay. Test is D-1 State of Alabama which is approximately 22 miles south of Mobile and 8 miles northeast of the mouth of the bay. The well has 20-in. conductor pipe at 250 ft. and at last report was drilling below 1,975 ft.

MISSISSIPPI SUCCESSFUL WILDCAT

Forrest County: Gas condensate discovery—I. P. LaRue-American Liberty Oil Co. 1 Crosby Forest Products Co., et al, 17-1s-13w, TD 8,343 ft., Lower Tuscaloosa 8,074-85 ft., IP: 103 bbl. condensate per day plus 1,239,000 cu. ft. of gas, 18/64-in. choke, TP 1,700 psi.

MISSISSIPPI WILDCAT FAILURES

Adams County: John S. Callon 1 Mrs. Annie Minter, 21-5n-1w, dry, TD 7,010 ft. B. Serio 1 Lauro Butler, 15-5n-5w, dry, TD 6,775 ft.

Franklin County: Lion Oil Co. 1 Lena, 17-5n-5e, dry, TD 11,170 ft.

Yazoo County: Carter Oil Co. 1 Federal Land Bank "C," -333, 19-12n-1e, dry, TD 10,092 ft.

ALABAMA WILDCAT FAILURE

Clarke County: James L. Duffy 1 Scotch Lumber Co., 24-7n-4e, dry, TD 5,270 ft.

Eastern Texas

New Sand Pay in Prospect For Hamm-Gossett Oil Field

DALLAS.—A new sand pay was in prospect for Hamm-Gossett field of Kaufman County southeast of Kemp at Humble Oil & Refining Co. 2-B Annie Mae Tuggle, E. Fitzgerald Survey. The well was said to have shown for approximately 20 ft. of oil sand, and a drill-stem test from 3,224-34 ft., identified as the Lewisville section of the Woodbine, recovered 1,740 ft. of oil in 34 minutes.

Humble continued coring at 1 Fred Marberry, Freestone County wildcat just northeast of Kirvin, and was below 7,953 ft. in sand and shale at last report. West of Yard, also in Freestone County, Humble 1 Mrs. A. Watson was reaming down to 7,213 ft., total depth.

In Grayson County, Pure Oil Co. 1 J. Earl Selz, wildcat 3 miles east of Tioga, was drilling below 2,354 ft.

A. J. Hickey 1 Hackelman, G. W. Cochran Survey, 4 miles east of Whitesboro, was in lime at 6,472 ft.

New exploration for Anderson County has been reported as Johnson Cone 1 John Caldwell. Location about 1 mile northeast of the Neches townsite is on a Texas Co. farmout. Gulf Oil Corp. was reported supporting the venture.

In Limestone County, Byrd-Frost & Byrd Oil Co. 1 A. P. Maddox, 5 miles northwest of Groesbeck, halted drilling at 5,800 ft. to run electric surveys. While no shows had been reported in either the Pettit or Travis Peak, the well had gas shows in the upper Rodessa.

The first oiler on the northeast side of Woodlawn field of Harrison County was in process of completion, and the same operators had staked location for a second test. The new producer is R. W. Fair 1 Medine. It will complete through perforations at 6,503-18 and 6,216-47 ft. after pumping unit is installed. The new location is to be the 2 Medine, located 2,325 ft. northeast of the first well.

EAST TEXAS (DISTRICTS 5 AND 6) SUCCESSFUL WILDCAT

Leon County: Humble Oil & Refining Co. 1 Lester Foran, T. Ross Sur., 7 mi. S Oakwood, TD 10,610 ft., Woodbine 5,725

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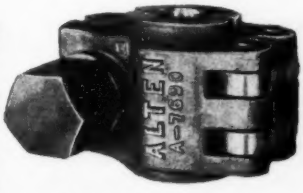

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EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT FAILURES

Anderson County: H. B. Pyle 1 S. W. Henderson Heirs, S. Arthur Sur., dry, TD 5,630 ft.

Cass County: Lyons, Prentis & McCord 1 S. S. Vest, G. S. Young Sur., dry, TD 7,205 ft., elev. 303 ft., Paluxy 3,965 ft., Travis Peak 7,005 ft.

Ellis County: R. C. Haynes 4 T. W. Christian, C. Garrett Sur., dry, TD 2,935 ft.

Falls County: Humble Oil & Refining Co. 1 Eleanor Carroll, J. Stephens Sur., dry, TD 3,717 ft., Paluxy 1,830 ft., Glen Rose 1,878 ft.

Grayson County: Kimbell-Sims 1 G. H. Russell, A. Tuttle Sur., A-1193, dry, TD 7,636 ft.

North Central Texas

Nolan County Wildcat Tests Oil From Reef Limestone

WICHITA FALLS. — General Crude Oil Co. 1 J. T. Harmon, Nolan County wildcat 4 miles north of Blackwell, reported top of a reef limestone at 4,606 ft., minus 2,380 ft. Drill-stem test from 4,604-23 ft. recovered 600 ft. of gas, then 150 ft. of oil and gas-cut mud, 75 ft. of oil and 285 ft. of salt water. Further oil shows were drilled from 4,814-27 ft., and a test covering that interval was under way.

In Jack County, Lone Star Producing Co. 1 Belle Alstot, J. Turner Survey, 7 miles east of Jacksboro, developed an estimated 4,000,000 cu. ft. of gas a day on drill-stem test in conglomerate between 5,126-42 ft. The 38-minute test produced 5 gal. of distillate. It was drilling ahead on a 6,000-ft. contract.

In Montague County, Eagle Petroleum Co. 1 Frank Collier was reported testing on perforations at 6,448-56 ft. At last report it was making from 8-10 bbl. of fluid an hour, being about 60 per cent oil.

In Wise County, Continental Oil Co. 1 Newsom, 2 miles north of Boonsville, was drilling ahead after showing gas on a drill-stem test in the Atoka conglomerate at 4,884-4,900 ft.

In Throckmorton County, 4 miles southeast of Woodson, Warren Oil Corp. 1 Reyford Mathiews was assured production from the Mississippi lime. Following acid treatment at 4,368-76 ft., the well produced 106 bbl. of oil and about 20 bbl. of water.

Engle Petroleum 1 Carminati, discovery offset northwest of Montague, prepared to complete in the conglomerate. Pipe was set on bottom at 6,434 ft. The discovery well was a Strawn sand producer.

Continental Oil Co.'s 1 Springer, Stonewall County wildcat northeast of Jayton, was reported dry at 6,948 ft. in Cambrian sand.

Completion was in progress at Dan Auld 1 Boyd, 46-D-H&TC, conglomerate discovery northeast of Aspermont in Stonewall County. The well was reported to have flowed 50 bbl. of oil an hour through ½-in. choke from perforations at 6,032-59 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Archer County: Gulf Oil Corp. 45 A. P. Nichols, 37-A959-ATNCI, TD 5,469 ft., Ellenburger 5,332 ft., pay 5,394 ft., IP pumped 176.8 bbl. 43°-gravity oil a day, GOR 599:1.

Eastland County: E. J. Walter 1 O. B. Jones, S. N. Mathis Sur., TD 1,150 ft., elev. 1,474 ft., pay 1,139 ft., IP pumped 11 bbl. 34°-gravity oil.

Montague County: O. E. Hall 1 J. P. Ligon, D. D. Baker Sur., TD 3,114 ft., pay 3,106 ft., IP flowed 139 bbl. 42°-gravity oil a day, 12/64-in. choke, TP 150 psi., GOR 350:1.

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Hill CSL, TD 7,207 ft., pay 7,185 ft., IP pumped 29 bbl. 40°-gravity oil a day.

Stephens County: Jack Hailey 1 Della Holt, 44-4-T&P, TD 1,920 ft., pay 1,905 ft., IP pumped 30 bbl. oil.

Wise County: Kingwood Oil Co. 2-C Jack E. Daly, Darrell Mangum Sur., TD 4,130 ft., Caddo 3,758 ft., perf. 3,916-34 ft., IP pumped 69.5 bbl. 38°-gravity oil.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: Milton Fish Drilling Co. 2 D. W. Fish, Block 84, Harris Subd., dry, TD 1,410 ft.

Lebus Bros. 1 L. F. Wilson, Block 109, ATNCL, dry, TD 1,556 ft.

Ted A. Norwood 1 W. H. Taylor, ATNCL Sur., dry, TD 1,735 ft.

Callahan County: Mid-Continent Petroleum Corp. 1-A Oscar Rose, Sec. 56, BAL Sur., dry, TD 4,901 ft., Ellenburger 4,705 ft.

Wilcox Investment Co. et al 1 J. L. Baum, Sec. 96, Comal CSL, dry, TD 1,577 ft.

Clay County: Armour Properties 1-C Scaling, J. H. Belcher Sub., dry, TD 4,751 ft.

Coleman County: Bishop Oil Co. 2 W. H. Davis, Block 11, T&NO, dry, TD 3,385 ft., elev. 1,999 ft., Fry 3,208 ft., Jennings 3,348 ft.

Comanche County: Frank Buttram 1 H. C. Little, Wm. Kegler Sur., dry, TD 3,843 ft., elev. 1,306 ft., Ellenburger 3,643 ft.

Cooke County: W. A. Lofton 2-B Cannon, J. W. Drummond Sur., dry, TD 1,315 ft.

Lofton 4-B Cannon, J. F. Johns Sur., dry, TD 1,315 ft.

W. F. & W. O. Russell 1 Campbell, O. F. Leverette Sur., dry, TD 1,446 ft.

Eastland County: Bert Fields 1 H. C. Pelfrey, 61-4-H&TC, dry, TD 3,674 ft.

Fisher County: Mendota Oil Co. 1 T. N. McRight, 77-1-H&TC, dry, TD 5,410 ft.

Haskell County: Intex Oil Co. 1 J. L. Toliver, 120-A155-J. Huffman Sur., dry, TD 5,714 ft., elev. 1,516 ft., Palo Pinto 3,198 ft., Capps 4,314 ft., Strawn sand 4,449 ft.

Jack County: Twin Oil Co. 1 L. T. Wood, SPRR Sur., A-573, dry, TD 4,652 ft.

Jones County: DeSoto Oil Co. 1 Chittenden, 16-335-L. Kratz Sur., dry, TD 3,500 ft.

Gulf Plains Corp. 1 B. P. Davenport, Sec. 23, D&DAL Sur., dry, TD 2,210 ft., Swastika 2,185 ft.

Jones & Stansey 1 W. C. Cannon, Sec. 6, D&DAL Sur., dry, TD 3,605 ft.

Montague County: Medders and Huff 1 Reynolds, B. H. Anderson Sur., dry, TD 6,598 ft.

National Associated Petroleum Co. 2 J. J. Lowery, Block 57, C. C. Hornsby Sur., dry, TD 1,517 ft.

Parker County: Cities Service Oil Co. 1 Glenn, Wm. P. McCarver Sur., dry, TD 6,756 ft., elev. 993 ft., Caddo 2,261 ft., Marble Falls 5,730 ft., Barnett 6,263 ft.

Shackelford County: Jesse L. Douglas 1 A. L. Black, Sec. 4, BAL Sur., dry, TD 693 ft.

Heinze & Sorrells 1 F. G. Gillette, Sec. 57, BOA Sur., dry, TD 4,108 ft., Caddo 3,422 ft., Ellenburger 3,990 ft.

H-H-R Drilling Co. 1 E. E. Anderson, 13-A-AB&M Sur., dry, TD 1,900 ft.

Stonewall County: G. E. Kadane & Sons 1 S. E. Lewis, 165-D-H&TC, dry, TD 6,633 ft., elev. 1,803 ft., reef 5,307 ft., Caddo 6,101 ft., Ellenburger 6,474 ft.

Champlin Refining Co. 1 C. H. Byrd, 406-D-H&TC, dry, TD 6,876 ft.

Herring Drilling Co. 1 E. O. Gillam, 22-D-H&TC, dry, TD 6,355 ft., elev. 1,698 ft., Canyon 4,130 ft.

Taylor County: Sid Katz and R. H. Venable 1 Lulu Fletcher, 8-1-LAL, dry, TD 5,514 ft., Palo Pinto 3,995 ft.

Miami Operating Co. 2 Joe Bettes, 143-64-H&TC, dry, TD 5,513 ft., elev. 2,310 ft., reef 3,957 ft.

Wichita County: John & Pat O'Neil 1-B Feldman, 19-5-H&TC, dry, TD 2,003 ft.

John & Pat O'Neil 1-G Waggoner, 27-5-H&TC, dry, TD 1,952 ft.

Wilbarger County: A. L. Andree 1 A. Vaughn, R. A. Barkley Sur., dry, TD 5,216 ft.

Young County: S. R. Baker 1 J. P. McKinley, TE&L Sur., A-803, dry, TD 4,904 ft.

Cox Drilling Co. 1 S. T. Seddon, A. Moore Sur., dry, TD 4,298 ft.

T. V. Gorman 1 Horany, Block 2, TE&L Sur., dry, TD 3,490 ft.

Bolin Oil Co. 1 Kathleen Preseton, Sec. 5, SPRR Sur., dry, TD 4,837 ft., Caddo 3,930 ft.

Texas Gulf Coast

Washington County Wildcat May Open New Wilcox Pool

HOUSTON.—Four and one-half miles north of Brenham in Washington County, Tex-Harvey Oil Co. 1 Winkelmann, wildcat, is reported to have logged a 30-ft. possible-pay section in the Wilcox between 7,500 and 8,000 ft. The well is now drilling below 9,500 ft. on a 10,000-ft. contract, and no tests have been made of the venture. All information is being withheld by the operator; however, interest focused on the well indicates that it will likely open a good Wilcox oil pool.

Potential test has been run on an unusually large gas discovery in Wharton County approximately 6 miles northwest of El Campo. J. B. Ferguson 1 Bender flowed 410,000,000 cu. ft. of gas daily from casing perforations in the Frio at 4,884-97 ft. Through 12/64-in. choke, the well made 1,780,000 cu. ft. daily. Dually completed, it also had a calculated open-flow potential of 16,500,000 cu. ft. daily from tubing perforations at 4,961-65 ft., also in the Frio.

Four miles east of Provident City (Yegua) production, Houston Oil Co. of Texas 1 Lewis Allen, et al, recovered good gas and distillate shows on side-wall samples. Shows were indicated at 6,087 ft.; 6,089 ft.; and 6,093 ft.

Sohio Petroleum Co. has run potential test on 1 B. E. Quinn, recent gas discovery in Liberty County. From perforations at 7,170-75 ft., the well had a calculated open-flow potential of 23,000,000 cu. ft. of gas plus 70 bbl. of 52.4°-gravity condensate. Drill site is in James Humphrey Survey, Abstract 212, 8 miles south of Cleveland.

Sunray Oil Corp. 1 W. A. Smith, wildcat 1½ miles northeast of Goebel field, Live Oak County, is at total depth of 7,548 ft., with pipe set 1 ft. off bottom and operators testing. The well recovered oil on drill-stem test at 7,170-80 ft.; oil from the Mackhank at 7,031½-40 ft.; condensate from the Luling at 6,793-6,803 ft.; and condensate from Slick-Carrizo at 6,647-59 ft. Further tests at 7,184-88 ft. had recovery of salt water and a little oil, and from perforations at 7,488-95 ft., it flowed water cushion with trace of oil in 5 hours. Recovery was mud and water cushion cut with gas and distillate. Operator squeezed these perforations and will continue to test.

A new gas-distillate sand has been opened in Cecil Noble field, Colorado County, at Pan American Production Co. 1 Max V. Rosenberg, which flowed 2,760,000 cu. ft. of gas daily plus 112 bbl. of 59.5°-gravity condensate. Production is from perforations at 8,889-8,900 ft. The well had an open-flow potential of 16,000,000 cu. ft. daily. Test is located 2 miles north of Columbus.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCAT

Live Oak County: Oil discovery—Harry Hotchkins 1-A W. Liska, John Jerrerman Sur., TD 982 ft., Hockley 975-81 ft., IP: 8 bbl. oil per day on pump, 20.2° gravity.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Bee County: C. F. McDougal 1 Maggie McKinney, Peters Allen Sur., A-77, dry, TD 3,546 ft.

Brazoria County: Cecil Hagen 2 J. H. Tig-

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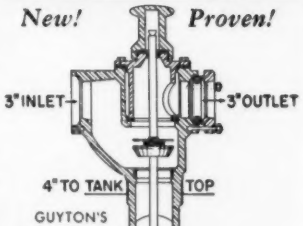

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ner, et al, F. Bingham Sur., A-43, dry, TD 5,656 ft.

Humble Oil & Refining Co. 1 Rattlesnake Mound State, West Bay, 14 mi. SE Danbury, dry, TD 1,401 ft.

Chambers County: Houston Oil Well Service Co. 1 W. E. Jenkins, Sec. 31, H&TC RR Sur., A-722, dry, TD 8,622 ft.

Goliad County: Morris Cannan 1 Calhoun, 1 mile SE of Charco, Maria de Jesus Y'barbo Grant, A-51, dry, TD 8,001 ft.

Kirkwood & Co., et al, 1 William Hoff, Peter B. Dexter Sur., A-319, dry, TD 9,515 ft.

Jefferson County: L. M. York, et al, 1 J. C. Dawson, W. B. Dyches Sur., A-17, dry, TD 7,204 ft.

Live Oak County: A. Humphreys 1 Nora Herring, Bridget Haughey Sur., A-9, dry, TD 993 ft.

V. G. Schimmel 2 C. W. B. Christensen, Antonio Fernandez Sur. 18, dry, TD 3,710 ft.

Oklahoma

Logan County Wildcat Shows in First Wilcox

INDICATIONS of production in the first Wilcox sand have been given in a wildcat test located a mile southeast of the unnamed second Wilcox sand pool recently opened by Zephyr Petroleum Corp., John G. Catlett, and associates in Logan County.

The new discovery has been made by O'Rourke-Baker Drilling Co. at its 1 Wallace, SW SW SW 22-17n-1e. First Wilcox sand was logged at 4,988-5,006 ft. with cores carrying good staining and odors. A 60-minute drill-stem test taken at 4,999 ft. with 12 ft. of pay exposed got 570 ft. of 42°-gravity oil and 300 ft. of oil-cut mud with 30 ft. of brackish water. Hole is now being deepened for a look at the lower Wilcox zone.

Sunray Oil Corp. has opened a new Hunton lime pool ½ mile northwest of Burnett and 5 miles southwest of Tecumseh, Pottawatomie County, where its 1 State, NW SE SE 16-8n-2e, flowed initially 130 bbl. of oil in 19½ hours through ⅝-in. choke. It flowed 95 bbl. in 17 hours during a test with ½-in. choke. Production is from casing perforations at 5,210-50 ft. Total depth is 6,069 ft. Bottom of casing is 5,354 ft.

W. C. Jackson has an indicated shallow oil discovery near the Pauls Valley townsite, in Garvin County, where his 1 Dixon, SW SE SE 9-3n-1e, has casing run to test a shallow sand at a total depth of 3,474 ft. A 75-minute drill-stem test from 3,463 ft. to bottom filled 1,420 ft. of clean oil, 170 ft. of heavily oil-cut mud, and 70 ft. of muddy salt water.

Sinclair Oil & Gas Co. got a substantial oil showing in Deese sand at its 1 Taylor, SE SE SE 33-7s-2w, a wildcat 1½ miles north of Leon, Love County, in the extreme southern part of the state. A 2-hour drill-stem test at 6,406-27 ft. had gas at the surface in 38 minutes and filled 1,046 ft. of 37.2°-gravity oil and 90 ft. of oil and gas-cut mud. Hole is being deepened.

Sinclair's 1 Community Travis-Sanders, in the NW SE NW 5-7s-1w, near the Pike townsite, southeast of the Stockton pool, on latest reports swabbed 37.8 bbl. of net oil in 14 hours. Production is from the Stockton Pennsylvanian sand, opposite which casing is perforated at 7,211-33 ft. with hole plugged back to 7,363 ft. from its former total depth of 9,414 ft.

Testing also continues at Continental Oil Co.'s Love County wildcat, 1 Moxley, SW SW SW 10-6s-1w, south of Cheek. It has been swabbing from 40 to 45 bbl. of net oil per hour from casing perforations in Deese sand at 7,317-22 ft., 7,302-14 ft., and 7,253-64 ft.

Sinclair Oil & Gas Co. is completing its 5-A Community Franklin, McLish sand discovery well in the old Moore field, Cleveland County. The well, a former second Wilcox sand producer, located in the C NE SE 21-10n-2w, was deepened through the lower Simpson section to 8,295 ft. Hole was plugged back to 7,760 ft. With casing perforated in McLish sand at 7,693-99 ft., the well flowed 428 bbl. (72 bbl. load oil and 356 bbl. new formation oil) in 14 hours.

OKLAHOMA SUCCESSFUL WILDCATS

Beckham County: United Carbon et al 1 Clark unit, C NE NW 32-12n-21w, flowed 33 bbl. 58°-gravity distillate from Hoxbar conglomerate at 12,720-14,600 ft., TD 14,685 ft.

Kay County: L. W. Prunty 1 Prunty, NW SE NW 28-27n-1e, flowed 75 bbl. 45°-gravity oil from Wilcox at 3,756-61 ft., TD; new pay in E. Blackwell.

Osage County: F. H. Lindsay 3 Osage, SE SE NE 32-26n-11e, pumped 9 bbl. oil from Bartlesville at 1,623-39 ft., TD; extension to Okesa.

Pottawatomie County: An-Son Petroleum et al 1 Trusdell, NE SE NW 31-8n-5e, pumped 30 bbl. oil from Hunton at 4,025-86 ft., TD 4,380 ft., old dry hole worked over.

OKLAHOMA WILDCAT FAILURES

Choctaw County: B. E. Davis 1 Parsons, NW NW SW 21-7s-16e, dry, TD 1,536 ft.

Garfield County: Jansen et al 1 Nolan, NW SW SE 28-23n-4w, dry, TD 1,680 ft.

Jackson County: Sun Oil Co. 1 White, NW NW SW 32-1s-22w, dry, TD 5,601 ft.

Kay County: Amerada Petroleum 1 Steichen, NE NE SE 2-26n-1e, dry, TD 4,297 ft.

Jones-Shelburne, Inc. 1 Milligan, NE NE SW 3-28n-1e, dry, TD 3,989 ft.

Colpitt 1 Bruce, SE SW NE 14-28n-3e, dry, TD 3,143 ft.

Lincoln County: Seran Drilling et al 1 Ellison, SW SW SW 4-12n-6e, dry, TD 3,219 ft.

Deardorf Oil 1 Pablo, NW NW SE 32-14n-5e, dry, TD 4,997 ft.

Mid-Continent Petroleum 1 Meadows, SE SW NE 25-15n-4e, dry, TD 4,890 ft.

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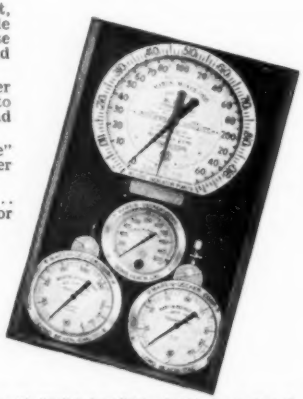

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Pawnee County: Ramsey 1 Laird, NW SE NW 2-22n-3e, dry, TD 4,084 ft.

Payne County: Flynn Oil 1 Cook, NW NW SW 15-17n-6e, dry, TD 3,557 ft.

Massad Oil 1 Arb, NW NE SW 26-19n-6e, dry, TD 3,503 ft.

Pittsburgh County: Public Service Co. of Oklahoma et al 1 Grace, C SW NE 7-6n-16e, dry, TD 2,448 ft.

Southwest Texas

Gonzales County Test Flows Oil From Soft Carrizo Sand

CORPUS CHRISTI.—Three miles west of Ottine production in Gonzales County, O. Neathery, Jr., 1 N. C. Stulting, new Carrizo sand oil discovery, is being slowly tested through a small choke to prevent break down of a very soft sand. The well is flowing 22.5°-gravity oil from gravel-packed open hole at 2,036-46 ft. and is reported to be making several barrels per hour. Tubing pressure is 500-550 psi. It is thought the well may be producing from the Arnim sand which is more than 100 ft. below the top of the Carrizo-Wilcox.

Meanwhile, the same operator has staked location for 2 Stulting, which 1,320 ft. south of the discovery.

Texas' deepest well, Superior Oil Co. 27 Minnie S. Welder, in Portilla field, San Patricio County, has been plugged back from 17,996 ft. and completed for 194 bbl. of 39.8°-gravity oil daily through perforations at 7,284-90 ft. Dually completed, it flowed 310 bbl. of 39.1°-gravity oil from perforations at 8,103-13 ft. Hole was cased with 7-in. to 16,123 ft.

Aransas Dock & Channel Co. 1 fee, wildcat 3 miles southeast of McCampbell production in Nueces County, has been completed for 7,000,000 cu. ft. of gas daily plus 35 bbl. of distillate per million cubic feet of gas. Production is from perforations at 7,295-7,311 ft.

C. G. Glasscock and Pontiac Refining Co. 1 State Tract 48, wildcat 6 miles northwest of Rockport in Copano Bay, is drilling ahead at 7,858 ft. The venture is credited with an estimated 80-100-ft. effective oil sand.

Four miles to the southwest of Rockport, off the south arm of Copano Bay, Anderson-Prichard Oil Corp. 1 J. F. Brundrett is drilling below 7,608 ft. The wildcat was cored from 6,955-80 ft. and had slight odor in sand at 6,973-75 ft. No tests have been made.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCAT

Frio County: Oil discovery—Forney & Winn 1 Marburger, Rusk T. Co. Sur., A-579, 5 mi. S of Big Foot, TD 3,536 ft., Navarro 3,496-3,536 ft., IP: 51 bbl. oil per day on pump, 46° gravity.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Caldwell County: A. W. Phillips 1 Joseph, Byrd Lockhart Sur., dry, TD 1,890 ft.

C. E. Starr, et al, 1 C. C. Crowell, Gerren Hinds Sur., 5 mi. NE of Luling, dry, TD 4,119 ft.

Duval County: H. R. Smith & Pontiac Refining Co. 1 Cenabio A. Cantu, Jr., E. J. Rouby Sur. 252, A-1152, dry, TD 5,005 ft.

Jim Hogg County: Sun Oil Co. 1 Lorine J. Lewis, Agua Nueva de Arriba Grant, A-257, dry, TD 5,563 ft.

Tri-Mark Oil Co. 1 Julian Vela Pena, et al, El Peyotte Grant, Geo. W. Rose Sur. 574, A-270, dry, TD 3,618 ft.

Jim Wells County: Gaylord H. Chizum 1 Willie Mae Almond, A. Benner Sur., Sec. 11, A-40, dry, TD 3,355 ft.

Nueces County: Bridwell Oil Co. 1 Emil Hinze, J. J. De La Garza Montemayor Grant, Share 4, Bluntzer Pt., dry, TD 6,500 ft.

H. R. Smith, H. J. Mosser & Southwestern Oil & Refining Co. 1 Frank Bartos, Casa Blanca Grant, dry, TD 6,229 ft.

Starr County: Bass & Vessels 1 Federico Moreno, Tract 112, Porc. 70, Juris of Camargo, dry, TD 2,040 ft.

Travis County: E. H. Wigner, et al, 1 Estate of Bruno Ehrlich by Ida Ehrlich, J. Betts Sur., dry, TD 950 ft.

Webb County: Boyce-Smiser-Runion Oil Co. 1 Adolf Moos, et al, CCSD&RGNG RR Sur. 63, Block 11, dry, TD 4,308 ft.

Willacy County: R. H. Abercrombie & V. F. Neuhaus, Tr. 6, Sh. 7, San Juan de Carricitos Grant, dry, TD 8,020 ft.

Wilson County: R. B. Paxson, et al, 1 K. Lux, S & J de Aroch Grant, dry, TD 759 ft.

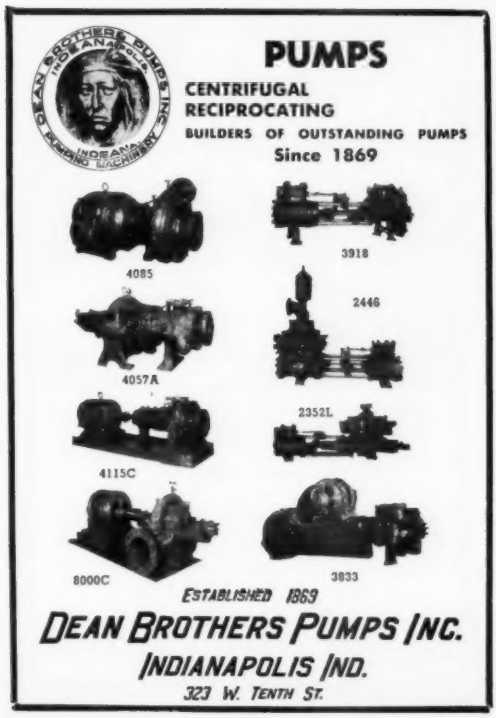
Rock Hill Oil Co. 1 Charles Bowman, J. R. Welch Sur., A-350, dry, TD 4,601 ft.

Zapata County: A. M. Lacey & H. E. Walton 1 fee, San Antonio de MIR A Flores Grant, dry, TD 4,019 ft.

Appalachian-Ohio

Big Lime Gasser Finaled in Wayne County, West Virginia

PITTSBURGH.—In Lincoln district of Wayne County, West Virginia, Priddy & Meabon completed 2 William Hogg gaging 2,214,000 cu. ft. of gas in the Big Lime formation at a total depth of 1,554 ft. In Wiliamsburg district, Greenbrier County, Deep Rock Oil Corp. 1 Bertha H. Thornbury et al, elevation 2,420 ft., is drilling at 3,237 ft. In St. George district, Tucker County, Lawrence Parshall 1 Floyd Stahl



et al, elevation 1,850 ft., drilling 774 ft. T. M. Pettigrew et al 1 John Timbrook, in Gore district, Hampshire County, elevation 1,198 ft., is drilling at 3,965 ft. In Beaver Pond district, Mercer County, United Fuel Gas Co. 6478 A. W. Hicks, elevation 2,834 ft., is running 5½-in. casing at 8,038 ft.

Maryland.—In Garrett County, Eberly & Snee 1 Eli Beechie gaged 53,000 cu. ft. gas from Oriskany sand at a total depth of 4,362 ft. The company's 3 fee, elevation 2,462 ft., topped the Oriskany at 3,817 ft. and is drilling at 3,902 ft. 1 Simms, elevation 2,405 ft., recorded the Tully at 3,170 ft. and is drilling at 3,512 ft. Mid Atlantic Oil & Gas Co. 1 J. C. Laschorn, elevation 2,846 ft., reached the Tully at 4,495 ft. and is drilling at 4,820 ft. Cumberland & Allegheny Gas Co. 1 H. M. Weeks recorded chert at 3,490 ft. with a small show of gas from 3,513-26 ft.

Pennsylvania.—South Buffalo Township, Armstrong County, Pennsylvania, Pittsburgh Plate Glass Co. 2-839 Mary A. McGinley, elevation 1,153 ft., is shut down at 6,766 ft. Napier Township, Bedford County, South Penn et al-Snee & Eberly 1 Jesse B. Miller, elevation 1,666 ft., is drilling at 8,920 ft. Unity Township, Westmoreland County, Peoples Natural Gas Co., 1-4003 A. J. Dotterway, elevation 2,094 ft., is drilling at 1,485 ft.

MARYLAND SUCCESSFUL WILDCAT

Garrett County: Eberly & Snee 1 Eli Beechie, elev. 2,439 ft. Onondaga 3,993 ft., chert 4,007 ft., Oriskany 4,125 ft., gas 4,209 ft., 53,000 cu. ft. per day, TD 4,362 ft.

OHIO

Foraker Drilling Co. has partially drilled in a well on 1 R. L. Endley, third quarter, New Castle Township, Coshocton County, that may be one of the best in New Castle pool. The Clinton was topped at 3,279 ft. and the well drilled 55 ft. into the sand when it filled up 2,800 ft. with oil. This well is a west offset to Preston 1 Richards.

Mid East 7 Samuel Gutridge, Section 23, Hopewell Township, logged the Clinton at 3,053-3,104 ft. with a good oil showing, natural. The well was shot with 150 qt. and flowed and swabbed 77 bbl. in 22 hours.

B. H. Putnam et al. 1 C. O. Ahart, Section 29, Belpre Township, Washington County, found the Oriskany at 4,080-4,116 ft. with a reported 500,000 cu. ft. of gas, natural. The sand was shot with 90 qt. and the well shut in 10 minutes after. It gaged 6,000,000 cu. ft. of gas.

Canadian Fields

Southeast Alberta Wildcat Taps Jefferson Heavy Crude

CALGARY.—Home Oil Co., Ltd., largest Canadian independent producer, obtained heavy crude oil encouragement at a wildcat in Southeast Alberta, about 140 miles east of Calgary. The Home-Atlee 1, in LSD 11, 34-21-7w4, had a 250-ft. rise of highly gassified, black crude oil during a 30-minute drill-stem test in the Jefferson formation. The zone was topped at 3,920 ft., entered porosity at 3,924 ft., and halted drilling at 3,930 ft. The test was run with packer set at 3,920 ft. Gravity of the oil is between 15° and 20°, and further coring and testing will have to be carried out prior to determining if the venture will be a commercial discovery.

The Jefferson (believed to be D2 Devonian equivalent) showed 6 ft. of porosity at bottom hole 3,930 ft. Mud difficulties and a fishing job have held up further coring operations, but it is expected that additional evaluation tests will be made soon. The Atlee well is the first wildcat on about 190,000 acres of Crown exploration reservation lands that Home Oil holds in that area.

Los Angeles Alberta Petroleums, Ltd., found natural gas in the basal Colorado formation at an exploratory venture in the Denhart area of southeast Alberta. Production string of casing is now being run, and the hole will be capped. The well, Los Angeles Alberta Pete 2, in LSD 10, 5-20-10w4, is located about 15 miles southeast of Sweetgrass-Maygill gas discovery well, about 50 miles northwest of Medicine Hat, and 120 miles east-southeast of Calgary. Company officials reported that it contacted basal Colorado sands at 2,896 ft. and ran a 10-minute drill-stem test around 2,904 ft. Natural gas flow rate was reported at 10,000,000 cu. ft. daily during the short test.

Albercan Oil Corp. has apparent oil success at a 1¾-mile step-out venture in the Lone Rock area of the Lloydminster heavy crude region in Saskatchewan. The new indicated heavy oil producer is Albercan-Franco-Epping 1, LSD 11, 20-47-27w3. A 22-ft. section of very good oil sand and excellent porosity was reported in the Sparky at 1,881-1,903 ft. It completed drilling at 2,100 ft., and crew is now running string of production casing.

CANADIAN SUCCESSFUL WILDCATS

Canadian Superior-Robertson 9-26, LSD 9, 26-30-3w5, TD 10,553 ft., 2,604,000 cu. ft gas plus 36 bbl. oil.

CANADIAN WILDCAT FAILURES

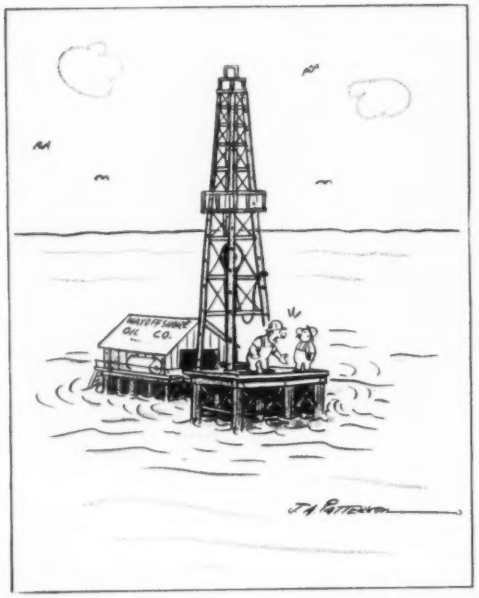
Heath 20-11A, LSD 11, 20-43-4w4, TD 2,776 ft., dry.

Loggie-Miller-Ardol 1, LSD 12, 32-51-24w4, TD 3,952 ft., dry.

Calvan-Sapphire-Prospy 2-14, LSD 2, 14-7-9w4, TD 2,500 ft., dry.

Amerada-Crown K F 41-7, LSD 16, 7-28-15w4, TD 4,135 ft., dry.

B. A.-Pakowski Lake 1, LSD 6, 19-4-6w4, TD 2,336 ft., dry.



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The question of gasoline price *affects every motorist. Here at Standard Oil Company of California, we receive some letters along these lines: "When I drive downtown, the prices of all the major gasolines seem to be about the same. I've heard it said that the major oil companies get together to set prices. Isn't this true?"*

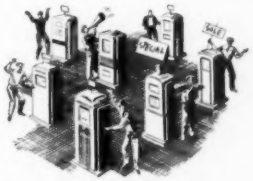
The answer is an unqualified NO. Oil companies do *not* get together to set prices, nor do we in *any* way set prices by agreement. But we do think it's in order to tell you about gasoline prices and how they're arrived at:

When you shop you find not only gasolines but *many* products of the same kind and about the same quality priced about alike. Prices just *naturally* tend to even up, and it's easy to see why. Suppose prices could *never* level out—

Suppose that by some rule a gas station operator were *forced* to sell gasoline at 2c a gallon *more* than his neighbors. Business would soon pass him by. Or suppose he had to sell for 2c a gallon *less* than his neighbors, still giving full quality and service. As his competitors cut price to hold customers, his income goes down. In time he would go broke.

These imaginary examples of set-price policy show what any gas seller actually faces. He must sell for enough to cover his costs and make a living . . . and he can't charge too much or he'll drive business away. Price is forced up by one factor, held down by the other. It's as simple as that.

We "set prices" only at stations we own and operate—Standard Stations, Inc. Here we put prices where experience shows us they should be, to cover our costs of products and service, and still let us sell in competition.



At Chevron Gas Stations the operators are completely independent. They set their own prices. You occasionally see a *range* of gasoline prices for the same or different brands in a single area, *until* competition finally forces the prices of similar products and services back to a common level.

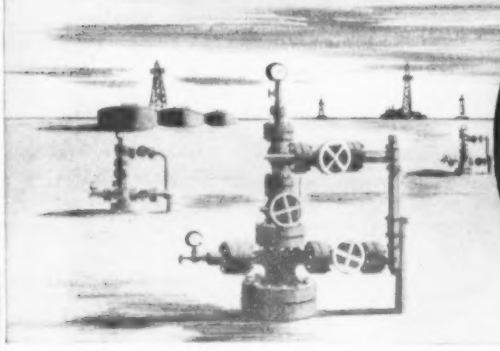
What comes out of all this is better products at low cost . . . the benefit you *always* get wherever free competition is given a chance to work. *Note this:* aside from taxes, and in spite of inflation, gasoline today costs about what it did in 1919, and is so much improved that two gallons now do the work that required three then.

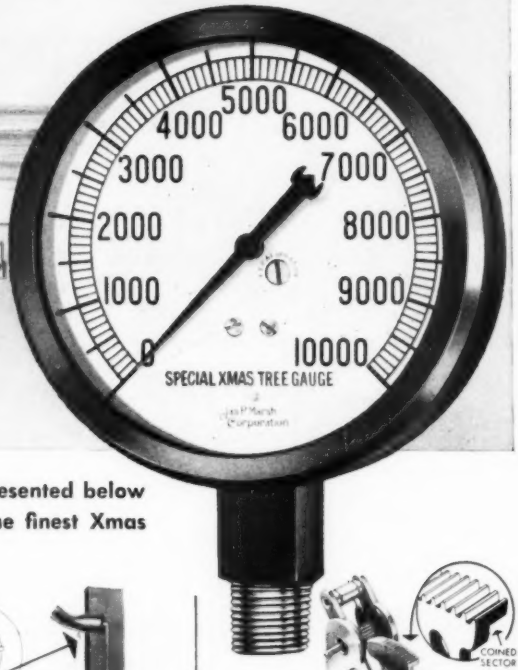
I'd Like to Know . . . Many people write to Standard asking pertinent questions about the Company. We answer all letters individually, but some points seem of general interest. We take this way of discussing them for every one. If you have a question, we urge you to write in care of: "I'd Like to Know," 225 Bush Street, San Francisco 20, California.

STANDARD OIL COMPANY OF CALIFORNIA

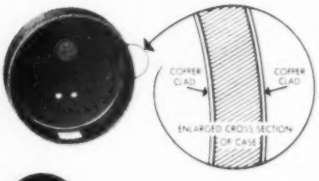
• plans ahead to serve you better

A NEW Xmas Tree Gauge



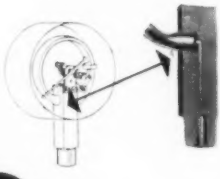


TAKE A GOOD LOOK at the facts presented below and we believe you'll agree that this is the finest Xmas Tree Gauge ever developed!



1 NEW *Marshalloy* CASE

A brand new conception in gauge housings. It is corrosion resistant, four times as strong and one-third lighter than conventional iron cases. It is made of copper-clad wrought steel of boiler plate thickness. It is much less likely to corrode than iron or steel, but has the strength of heavy-gauge steel. Known as "Marshalloy," it has all the advantages of plastic or die-cast cases, but none of the disadvantages. It can't be broken like a plastic or die-cast case. It won't rust or corrode. It has four times the strength of cast iron, but only two-thirds the weight. Finished in a new corrosion resistant, satin black enamel, and fitted with Marsh safety blow-out plug, it is the finest case you have ever seen.

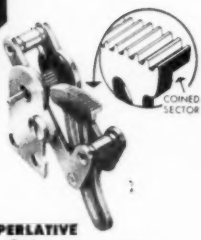


2 NEW *Conoweld* TUBE

Tube, socket and end-piece "Conoweldod" into an integral unit

To insure absolute dependability, a gauge must be made permanently leak-tight from inlet to end-piece of the bourdon tube. This has always presented a tough problem, but here is the final solution. By a special process the tube is "Conowelded" into socket and end-piece to form the equivalent of one-piece construction. The tube is then accurately tempered to required resiliency.

The unretouched photo of a socket sawed in half shows the perfect fusion of the joint at the point where the bourdon tube enters the socket—the joint that is most difficult to make. Photomicrographs are also available to prove the perfection of this process.



3 SUPERLATIVE *Mastergauge* **MOVEMENT with coined sector**

The crowning touch to the Xmas Tree Gauge is the Marsh "Mastergauge" Movement. In tens of thousands of Marsh "Mastergauges" this finer movement has proven its ability to stand the gaff of oil country service better than any other.

Notice the broad pinion gear and coined sector gear surfaces with teeth cut to the highest standards of precision. The coined form (see enlarged section) is a typical Marsh refinement — a form that gives greater strength where greatest strength is needed. Unlike metals, giving a self-lubricating frictionless effect, are used throughout. It is a movement in keeping with the advanced design and construction of this new Gauge.

MARSH INSTRUMENT CO. Sales affiliate of Jas. P. Marsh Corp. **Dept. L, Skokie, Ill.**

Houston Branch Plant **1121 Rothwell St., Houston, Texas**

MARSH GAUGES

Central Area

ILLINOIS

T. C. Mullins (trustee) and associates have what appears to be another Silurian "reef" oil discovery at their 1 Carl Easdale, SE NE NW 16-4s-5w, in the northeastern corner of Randolph County, on the west side of the Illinois basin, in the extreme southwestern part of the state.

The prospective Silurian pay was logged at 2,419-33 ft., where a drill-stem test recovered 820 ft. of clean oil. Hole has been drilled to 2,435 ft. and cased to the top of the pay for completion.

Location is approximately 5 miles northeast of Sparta, and about 2½ miles south of the Washington county line and 3½ miles west of the Perry county line. Nearest oil production is the McKinney pool, another Silurian reef, 7 miles to the northeast in Washington County.

C. E. Brehm 1 Seifert, NW NW SE 2-3s-9e, 5 miles southeast of Goldengate and 1½ miles east of production in the Goldengate Consolidated pool, failed to make a well in the McCloskey lime, and has been plugged back to the O'Hara lime, where better indications of production were given in drill-stem tests. A 60-minute drill-stem in the latter zone at 3,292-97 ft. had gas at the surface in 22 minutes and yielded 360 ft. of clean oil. McClosky lime, opposite which casing was perforated at 3,391-96 ft., tested water with an oil showing. Total depth was 3,415 ft. Present plug-back depth is 3,299 ft.

Oil showings also have been obtained in a wildcat test located a mile southeast of production in the New Harmony South pool, in the Wabash River bottoms, in White County. The prospective well is W. C. McBride 1 Truscott, SE NE SW 28-5s-14w. Best showings were in Cypress sand at 2,675-80 ft., where a 60-minute drill-stem test got 64 ft. of oil and 60 ft. of oil-cut mud. A similar test in Rosiclare lime at 3,009-17 ft. got 90 ft. of oil and gas-cut mud. Hole is being deepened for a look at the McClosky. The area is 5 miles southwest of the town of New Harmony, across the river in Indiana.

INDIANA

National Associated Petroleum Co. has a new Aux Vases lime oil discovery at its 1 Davidson, SWc Location 8-1n-10w, in the Hazelton area, northeastern Gibson County, just south of the Knox county line. The well has been completed on the pump making approximately 20 bbl. of net oil daily. Pay is at a total depth of 1,674 ft.

WESTERN KENTUCKY

Extension of the Hitesville Consolidated pool, on the Henderson-Union county line, is in prospect where John N. Partin and E. B. Martindale are testing McClosky lime oil showings at 2,572-87 ft. at their 2 Cavins, SE SE SE 15-P-21. In a drill-stem test of the zone, the well gassed in 6 minutes and flowed clean oil in 28 minutes. The location, on the Henderson County side of the line, is west of production at the north end of the pool. It is 4 miles southwest of the town of Smith Mills.

EASTERN KENTUCKY

In Pilot pool of southern Powell County, Agatha Wireman has added another light producer to the east of generally established production. The 1 Robert Boyd on San Lick Creek topped Corniferous lime at 810 ft. and is good for several barrels oil daily at total depth of 891 ft. in the lime.

In Pike County sector of Big Sandy gas field of extreme eastern Kentucky, a good gas well has been completed by Kentucky West Virginia Gas Co. at 5993 John H. Atkins. At total depth of 2,072 ft. in the Maxon (Mississippian) sand, well gaged 3,834,000 cu. ft. of gas daily.

In John Creek pool of northeastern Floyd County, A. V. Hoenig and Ashland Oil & Refining Co. are drilling at 500 ft. on 3 James Nunnery. Test is west offset to recently completed Big Lime well good for 20 bbl. per day.

MICHIGAN

E. V. H. Hilliard was testing a Richfield oil pay at the R. L. 1 State-Roscommon, N/2 SE SW 29-21n-3w, Roscommon Township, Roscommon County, this week. This new well may prove to be a deeper zone discovery for the Headquarters structure which is now producing oil from both the Traverse and the Detroit River sour zone.

The Richfield section was topped at 5,145 ft. (base of the big anhydrite section) and the hole was drilled to a total depth of 5,346 ft. The long string of 5-in. casing was set and cemented at 5,145 ft. Cores of the objective showed porosity at 5,155-57 ft., 5,162-63 ft., 5,166-67 ft., 5,206-07 ft., 5,231-33 ft. and 5,250-52 ft. After the well was cleaned out with cable tools to the total depth, it carried 1,000 ft. of fluid overnight. More than half of the fluid showing was oil. After being swabbed down each day for several days, the hole filled back to the 1,000-ft. level and the ratio of oil to water was reported to be increasing. At last report, tubing was being run in preparation for acid treatment of this potential Richfield pay section.

Although there have been other Richfield objective tests drilled on the Headquarters feature, this is the first deeper wildcat to show for possible successful completion in the lower objective. The wildcat is also located nearer to the defined top of the structure. Besides Hilliard and associates, others with acreage around this possible new Richfield discovery include Sun Oil Co., Pure Oil Co. and C. K. Dean et al.

Hilliard, C. K. Dean and Jack Uhl are now drilling below 4,465 ft. at the 1 State-Roscommon, N/2 SW SE 29-21n-3w, the east offset to the possible discovery. This offset location was originally scheduled to be drilled to the Detroit River sour oil objective, but since this more recent development it will test the Richfield.

(Continued on page 128)

Rocky Mountain

Sixth Williston Discovery Apparent at Montana Test

DENVER.—A new discovery for the Williston basin is apparent with the recovery of oil on a drill-stem test in the Mississippian at the C. H. Murphy, Jr., wildcat at East Poplar, Roosevelt County, Montana. This well made 3,200 ft. of oil and 500 ft. of oil and gas-cut mud on a 20-minute test at 5,664-82 ft. The oil is 38° gravity, light green, and similar to that found in other wildcats in this portion of the basin. The wildcat, Murphy's first venture in the basin, is 30 miles northeast of Shell Oil Co.'s Richey area wildcat, which recently made oil from the same formation. Shell is drilling below 10,300 ft. The Murphy well is the third in the Montana portion of the basin to find oil, and the sixth wildcat in the Montana-North Dakota portion to find oil.

Across the line in North Dakota, Amerada Petroleum Corp., who made the first basin discovery, has announced location for its fourth wildcat along the long Nesson anticline. The 1 North Dakota "A," C NE SE 16-156n-95w, Williams County, is between Beaver Lodge and Tioga areas. Oil has been found in the Mississippian in both the latter areas, 20 miles apart, and one well was completed as a Devonian producer.

Seaboard Oil Co. recovered 3,300 ft. of oil on a 1-hour drill-stem test of the zone 5,788-5,825 ft. at 1 State-Unit, NE NW SW 16-56n-98w, Whistle Creek, Park County, Wyoming wildcat. Production was from the top 28 ft. of the Tensleep formation. The well is located on a unitized block between Garland and South Elk Basin fields, along the northeast side of the Big Horn basin. Seaboard also produces oil from the Frontier and Embar formations at its Silver Tip field, northwest of the new Whistle Creek discovery.

British-American Oil Producing Co. tested oil from the first Sundance and is now headed for the Nugget sand at 1 State-Horne Brothers, NW SW NW 16-21n-78w, wildcat in Carbon County, Wyoming. First Sundance was found at 6,181 ft. and on a 1-hour test at 6,185-6,200 ft., the well made 1,590 ft. of oil and 450 ft. of heavily oil and gas-cut mud. Another test at 6,200-50 ft. showed 100 ft. of oil and gas-cut mud in 1 hour. British-American is running casing to total depth and will core ahead for the basal Sundance (Nugget) sand. The wildcat is 4 miles east of Big Medicine Bow field, which produces oil from the Sundance and Tensleep formations.

Oil was found on a drill-stem test in the "J" sand at Zimith Drilling Co. 1 Nay, SW SW NE 14-9n-58w, wildcat in Weld County, Colorado. The sand was topped at 6,256 ft., and on a 20-minute test at 6,250-80 ft., the well made 180 ft. of oil, 180 ft. of heavily oil-cut mud, and 240 ft. of water. The wildcat is north of Buckingham field, where Shell Oil Co. has production, and west of the majority of new discoveries in the current Denver-Julesburg basin play. South of Buckingham, Shell is completing the Goodrich area discovery at 1 Williams, NW NW SE 30-5n-60w, Morgan County. The well made oil on a drill-stem test of the Muddy and was drilled to 6,953 ft., total depth, in the Morrison.

WYOMING WILDCAT FAILURES

South Big Muddy, Converse County: Western Oil Fields 1 State "B," C SE SE 11-33n-76w, TD 5,265 ft., dry.

West Big Muddy, Natrona County: Brinkerhoff Drilling Co.-Delaney 1 State "A," C SE SE 17-33n-77w, TD 5,550 ft., dry.

COLORADO WILDCAT FAILURES

South Price, Archuleta County: J. R. Butler 2 P. C. Crowley, C SE NE 19-32n-2e, TD 1,740 ft., dry.

Florida Mesa, La Plata County: Greenbrier Oil Co. 1 Simon, W/2 NW NW 27-34n-9w, TD 5,900 ft., dry.

Southeast Merino, Logan County: B. B. Carter 1 California, C SE NW 27-6n-54w, TD 4,972 ft., dry.

MONTANA WILDCAT FAILURES

Box Elder, Blaine County: Northern Ordnance 1 Morphey, NW Bowes Dome field, TD 4,212 ft., dry.

Pike Creek, Fergus County: J. E. Mc-Kenna 1 Hughes, E/2 NW NW 26-13n-24e, TD 763 ft., dry.

Winifred: Belle-Truesdelle 1 Idings, SW NW SW 29-21n-18e, TD 930 ft., dry.

Kootenai Dome, Petroleum County: Amerada Petroleum Corp. 1 Kootenai unit, C Lot 2, 18-16n-26e, TD 3,250 ft., dry.

UTAH WILDCAT FAILURES

Watson, Unitah County: Continental Oil Co. 2 Strat test, S/2 SW SW 14-10s-24e, TD 3,315 ft., dry.

Diamond Fork, Utah County: Sun Oil Co. 1 Unit, C SE SE 7-8s-5e, TD 1,978 ft., dry.

WESTERN NEBRASKA SUCCESSFUL WILDCAT

Sisson area, Kimball County: Gulf Oil Corp. 1 Sisson, NW NW NW 18-12n-58w, TD 7,431 ft., flowed 260 bbl. oil, "J" sand 7,325 ft.

WESTERN NEBRASKA WILDCAT FAILURE

Deuel County: Magnolia Petroleum 1 Alfred Robb, SE SE NE 18-14n-42w, TD 5,825 ft., dry.

NORTH DAKOTA WILDCAT FAILURES

Cavalier County: Union of California-Hancock-Signal 1 fee, C NW SW 32-160n-60w, TD 2,765 ft., dry.

Union of California-Hancock-Signal 1 Ellis-Union Central Life Insurance Co., C NW NE 12-161n-60w, TD 2,271 ft., dry.

Union Oil of California-Hancock-Signal 1 Restad, C SW NW 26-162n-64w, TD 3,380 ft., dry.

Union Oil of California-Hancock-Signal 1 fee, NW NW NW 28-159n-53w, TD 3,409 ft. dry.

Permian Basin

Parks-Pennsylvanian Pool Extension Try Tests 216 Bbl.

MIDLAND.—American Viking Corp. 1 McCaughey, extension well to the Parks-Pennsylvanian field, was taking potential at last report. The well was drilled to 10,600 ft., 439 ft. into the formation. The upper portion showed for production, but completion perforations were from 10,520-60 ft. On initial test, through 16/64-in. choke, the well flowed 144 bbl. of new oil in 24 hours. Further acid treatment through the same perforations had increased the oil flow to 9 bbl. hourly through the same choke.

In northwest Midland County, Blackwood & Nichols 1 Moss was drilling below 11,647 ft., with formation tops not yet identified, or released. Field sources placed the present depth as probably Devonian.

Greenbrier Oil Co. 1 McAlister was in the Devonian, topped by samples at 11,229 ft. A core from 11,238-53 ft. recovered 14 ft. of lime with slight porosity and oil stain. First drill-stem test of that interval failed due to mechanical difficulties.

First test in the lower Devonian at Moore Exploration Co. 1 Dowlen-Houpt had no shows of oil or gas from the interval at 12,190-12,246 ft.

Humble Oil & Refining Co. 3-B Sorrells, 97-25-H&TC, had prospects of Wolfcamp production on the south side of Sharon Ridge Canyon field of Scurry County. Location is an east offset to a Canyon reef producer.

Operators reported soft drilling from 5,440-66 ft., total depth. The well made a strong kick, then unloaded oil and gas and drilling mud by heads, while drill pipe was being pulled from the hole. Mud weight was being built up for a drill-stem test.

Northeast of Salt Creek field in Kent County, Seaboard Oil Co. and Republic Natural Gas Co. were drilling near contract depth of 7,500 ft. at 1-C Girard Trust. A drill-stem test from 6,816-48 ft. recovered 40 ft. of slightly oil and gas-cut mud.

Gulf Oil Corp. 1-A Dean, deep operation in the new Snowden Spraberry field of Dawson County, recovered mud and salt water on a drill-stem test at 10,302-62 ft. Previously, clean oil was developed on tests at 10,029-73 and 10,288-10,303 ft., the latter depth being in the water.

Gulf 1-Y Dean was coring ahead at 10,909 ft. in dolomite and chert. This well cored dolomite with fair porosity and bleeding oil from 10,587-10,637 ft. but recovered mud with no shows on test from 10,707-72 ft.

South of the Wilshire Ellenburger field of Upton County, Greenbrier and Anderson-Prichard 1 E. Windham had total depth at 11,208 ft. in lime and chert and prepared to core ahead. Top of the Devonian was reported at 11,160 ft.

Sohio Petroleum Co. 1 Mary V. Bryans "A," deep test in Driver Spraberry field of Glasscock County, had total depth at 8,525 ft. and was preparing to test in Dean sand. The well had prospects of production in the regular Spraberry zone.

Magnolia Petroleum Co. 1 University, Lease 36,994, northeast Andrews County wildcat which has been projected to 14,000 ft., picked top of the Spraberry at 8,500 ft. Elevation had not been reported. Drill-stem test from 8,528-8,632 ft. recovered 480 ft. of slightly gas-cut mud, and 30 ft. of oil and gas-cut mud. Location is on the west edge of the recently published Spraberry trend map and about on the 5,500-ft. contour line.

New Gardner sand pay for Runnels County was in prospect at B. C. Morrison 1 Brandon, 2 miles northeast of Crews field in Parramore Survey. Drill-stem test, open 15 minutes, from 3,838-56 ft. had 1,320 ft. of oil in the pipe after unloading some oil on the way out. Top of the sand was 3,834 ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Irion County: Moore Exploration Co. 1 W. M. Noelke, 1150-A-1146-TCRR, TD 7,838 ft., elev. 2,510 ft., Ellenburger 7,794 ft., pay 7,819 ft., IP flowed 250 bbl. 44°-gravity oil a day, 20/64-in. choke, GOR 682:1, TP 125 psi.

Midland County: The Texas Co. 1 Fletcher Currie, 29-40-2S-T&P, TD 8,805 ft., elev. 2,626 ft., Spraberry pay 7,880 ft., IP pumped 32 bbl. 34°-gravity oil a day.

Runnels County: Miami Operating Corp. 1 Joe Ashton, Sec. 262, Austin & Williams Sur., TD 3,850 ft., Gardner 3,783 ft. ,IP flowed 114 bbl. 41°-gravity oil a day, 5/16-in. choke, TP 225 psi., GOR 900:1.

Sutton County: Shell Oil Co. 3 W. A. Miers, 53-14-TW&NG, TD 5,009 ft., PB 4,281 ft., IP 13,000,000 cu. ft. gas a day, open tubing.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Bailey County: Phillips Petroleum Co. 1-A Stephens, 24-B-M&B&B, dry, TD 8,244 ft., elev. 4,025 ft., Clear Fork 5,057 ft., Abo 6,361 ft., granite wash 8,125 ft.

Coke County: Ralph Wilson 1 Walter Moore, N. S. Anderson Sur. 3, dry, TD 6,777 ft., elev. 1,970 ft., Canyon 4,524 ft., Strawn 5,470 ft., Caddo 6,125 ft., Ellenburger 6,540 ft., Hickory 6,740 ft.

Ralph Lea 1 L. E. Cowley, Block 3, Caldwell CSL, dry, TD 1,550 ft.

Union Oil Co. of California 1-A-H&TC, dry, TD 5,454 ft.

Crockett County: Gulf Stream Oil Co. 1 University, 21-40-University Lands, dry, TD 1,878 ft.

Ector County: W. M. and A. P. Fuller 1 Max David, 7-B15-PSL, dry, TD 6,255 ft., elev. 2,998 ft., Glorietta 4,725 ft., Clear Fork 4,955 ft., Tubb 5,780 ft.

Garza County: Tobe Foster 2 Justice Heirs, 19-6-H&GN, dry, TD 4,859 ft.

Kenneth Murchison 1 John Sealy Hospital, 105-5-GH&H, dry, TD 3,085 ft.

Hockley County: Honolulu and Signal 1 W. F. Brown, 23-4-Jones CSL, dry, TD 10,700 ft., elev. 3,393 ft., San Andres 3,990 ft.

Kent County: Cosden Petroleum Corp. 1 W. G. Williams, 6S-5-H&GN, dry, TD 8,055 ft., elev. 2,355 ft., Strawn 7,050 ft., Mississippian 7,660 ft., Ellenburger 7,830 ft.

Martin County: Phillips Petroleum Co. 1-A Clinton, 10-35-1S-T&P, dry, TD 7,625 ft., elev. 2,520 ft., Spraberry 6,634 ft.

Pecos County: Gulf Oil Corp. 1 Theo Winfield, 3-132-T&STL, dry, TD 15,468 ft., elev. 3,064 ft., San Andres 3,020 ft., Glorietta 3,840 ft.

R. H. Henderson 1 Bennett, 2-105-Joseph Heller Sur., dry, TD 2,602 ft.

Reagan County: B. B. M. Drilling Co. 1-4 Proctor, 4-C-L&SV, dry, TD 7,200 ft., elev. 2,705 ft., Spraberry 6,882 ft.

Runnels County: Baker & Taylor Drilling Co. 1 Nona Brannon, 8-448-Hickman Sur., dry, TD 5,517 ft.

G. W. Strake 1-A P. F. White, HT&B Sur. 1, dry, TD 4,414 ft.

TEXAS PANHANDLE

AMARILLO.—New oil production for the Anadarko basin is indicated by results of a drill-stem test taken on The Texas Co. 1 Fliwers, wildcat east of Lips field in Ochiltree County.

The well, on a 2-hour test from 8,832-8,900 ft., had gas to the surface in 69 minutes, estimated at 30,000 cu. ft. per day. Recovery was 110 ft. free oil, 455 ft. heavily oil and gas-cut mud, 860 ft. lightly oil-cut and heavily gas-cut mud, and 950 ft. heavily gas-cut mud. Flowing pressure ranged from 0 to 325 lb., and 15-minute bottom-hole pressure was 1,975 lb. Casing is being run.

The 1 Flowers is 3½ miles from nearest production in Lips field, and structurally, may indicate a new pool. The Texas Co. B-1 McGarraugh, the only oil well in the six-well Lips field, is located 4 miles to the west and is separated from the 1 Flowers by a dry hole.

Sample correlations reveal the 1 Flowers to be 510 ft. lower than the McGarraugh. However, geologists believe the producing formation in the 1 Flowers to be the same as other Lips field wells, with one exception. Gas in the Sinclair 1 Lips is from the Tonkawa, while the other field wells have Atoka production.

Another Lips field outpost is waiting on Railroad Commission test after definitely extending gas production 2 miles south-

(Continued on page 129)

Louisiana-Arkansas

Production Tests Planned At Three Apparent Strikes

SHREVEPORT.—Six miles east of Monroe in 6-17s-5e, Ouachita Parish, Monla Gas Co. et al. 1 Huenefeld, prospective discovery, ran 5½-in. casing to 5,320 ft. A 40-minute drill-stem test at 3,781-3,809 ft. recovered 123 ft. of gas-cut mud with a top pressure of 68 psi.

Sun Oil Co. plugged back 1 Concordia Parish School Board from 9,115 ft. to 7,615 ft. and ran 5½-in. casing to 7,300 ft. It will test shows in the Wilcox at 7,201-08 ft. Other oil sands were indicated in the Sparta at 5,401-04 ft. and 5,435-42 ft. The venture is located in 64-2n-8e.

Also in Concordia Parish, Barnett Serio 1 Wilds has cemented 5½-in. string on bottom 5,515 ft. The hole, located in 7-7n-7e, will be perforated in the Wilcox for production tests after a drill-stem test at 5,130-35 ft. recovered 60 ft. of water and mud with a show of oil.

In the same parish, a new pool 3 miles northwest of Slocum, 29-4n-8e, was reported last week as being opened by Hunt Oil 1 Dale. The well name has been changed to 1 E. F. Yakey. The second well, previously reported as 2 Dale, should be 2 Yakey.

Arkansas.—Skelly Oil Co. 1 Philyaw, 2 miles northwest of Northeast Fouke field in Section 20-16s-26w, Miller County, is apparently a confirmed discovery. Latest drill-stem test of perforations at 3,554-56 ft. in the Tuscaloosa yielded 2,040 ft. of oil, 60 ft. of mud, and 300 ft. of water. Operator is running tubing to complete. Total depth is 5,840 ft. with casing set to 3,791 ft. Production was previously indicated when 30°-gravity oil was recovered on a test at 3,554-60 ft.

In Nevada County, Sinclair Oil & Gas Co. 1 Nichols has resumed drilling toward its 5,850-ft. objective. Located in 30-14s-22w, the wildcat recovered 60 ft. of mud from the Jam s lime at 3,203-85 ft. Cores at 2,759 ft. in the Kilpatrick had slight oil shows.

NORTH LOUISIANA WILDCAT FAILURES

Bossier Parish: Haltouty & Sorelle 1 Adams, C SE NE 24-15n-11w, dry, TD 5,120 ft.

Catahoula Parish: Placid Oil Co. 4 Farrier, C NW NE 12-4n-5e, dry, TD 7,515 ft.

Concordia Parish: Barnett Serio et al 1 Brown, C SE SE 19-7n-7e, dry, TD 6,930 ft.

Grant Parish: Hunt et al 1 International Paper Co., 702 ft. S and 618 ft. W NEc 20-8n-4w, dry, TD 4,502 ft.

Tensas Parish: Justiss-Mears Oil Co. 1 Dale, C NW NW 36-10n-9e, dry, TD 6,088 ft.

Winn Parish: Natural Gas & Oil Corp. 4 Urania Lumber Co., 1,520 ft. N and 1,820 ft. W SEc 20-11n-1e, dry, TD 6,763 ft.

ARKANSAS WILDCAT FAILURES

Drew County: McAlester Fuel Co. 1 Crossett Lumber Co. "G," 100 ft. NW C NW NW 25-14s-9w, dry, TD 4,006 ft.

Independence County: R. L. Jones 1 Norris, NW NW SE 17-12n-4w, dry, TD 505 ft.

Lafayette County: Stewart et al 1 Monzingo, C NE SW 22-15s-24w, dry, TD 7,239 ft.

Lonoke County: Moon Exploration Co. 1 Griffin, SE SE SE 28-5n-9w, dry, TD 1,308 ft.

On the
OIL PROGRESS TEAM

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- GASOLINE DISPENSING UNITS—Siamese Rol-Way serves 2 cars at once
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- AUTOMATIC PROPORTIONING SYSTEMS for oil, additives, chemicals, etc.
- CLOUD AND POUR TEST UNITS
- WATER SEPARATORS for gasoline, diesel fuel, etc.
- DRUM FILLERS
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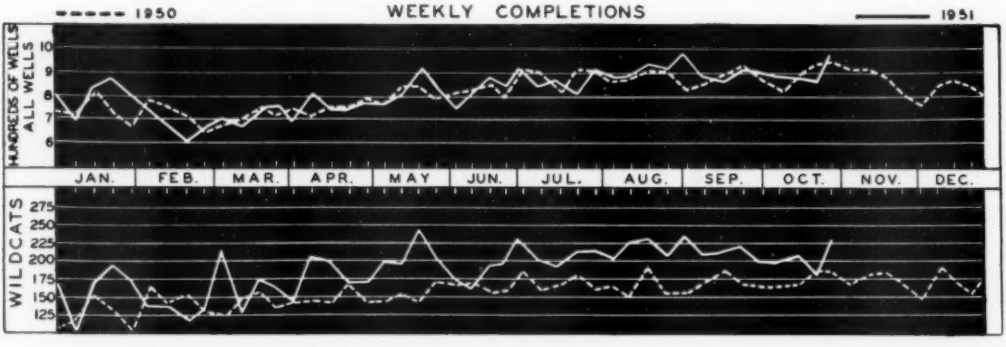
CURRENT STATISTICS

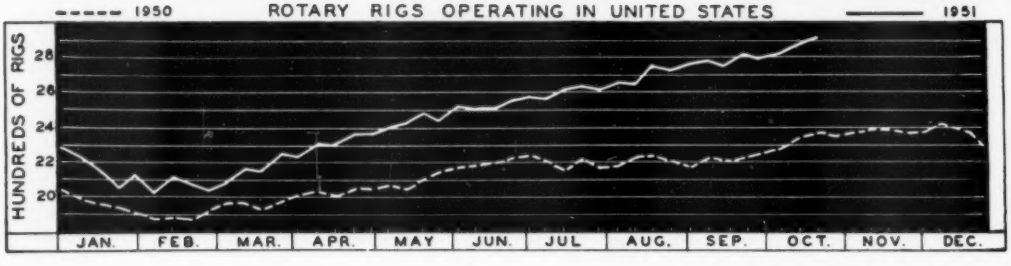
EXPLORATION

WEEKLY WELL COMPLETIONS . . . . . WEEK ENDED OCTOBER 27, 1951

	Total of all wells					Oct. 27		Wildcat completions and discoveries									
													**Cum. total, 1951				
	Comp.	Oil	Gas	Dry	Footage	1951	1950	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	12	6	0	*6	18,064	538	583	0	0	0	0	0	0	0	0	0	0
Pennsylvania	29	11	9	†9	45,514	1,212	1,135	0	0	0	0	0	0	0	2	2	4
West Virginia	15	2	9	4	39,286	504	551	0	0	0	0	0	0	0	7	4	11
Ohio	21	8	6	17	42,028	793	849	0	0	0	0	0	1	0	5	25	31
Indiana	38	12	0	26	66,910	1,110	1,323	1	0	0	15	16	53	0	2	396	451
Kentucky	34	12	5	17	69,375	1,027	953	0	0	0	1	1	34	0	1	191	226
Illinois	54	22	0	32	140,846	1,957	2,337	2	0	0	15	17	77	0	0	617	694
Michigan	17	3	0	§14	39,341	635	733	0	0	0	9	9	11	0	5	269	285
Kansas	99	61	6	32	340,992	3,593	3,255	6	0	0	17	23	170	1	12	722	905
Nebraska	3	2	0	1	19,751	192	92	1	0	0	1	2	15	0	2	93	110
Oklahoma	114	65	5	¶44	370,638	4,588	4,466	3	1	0	14	18	148	5	20	590	763
Texas	353	217	12	124	1,700,746	13,678	13,562	11	1	1	81	94	613	49	103	2,806	3,571
North Central (Dist. 7-B & 9)	99	49	1	49	340,491	4,139	4,100	6	0	0	36	42	297	3	13	1,203	1,516
West (Dist. 7-C & 8)	132	107	4	21	757,776	4,176	4,088	3	0	1	16	20	152	10	7	529	698
Panhandle (Dist. 10)	14	8	5	1	41,356	588	762	0	0	0	0	0	2	0	0	24	26
Eastern (Dist. 5 & 6)	21	9	0	12	118,838	984	949	0	1	0	5	6	9	9	2	191	211
Gulf Coast (Dist. 2 & 3)	42	23	2	17	256,342	1,896	1,905	1	0	0	9	10	81	19	49	392	541
Southwest (Dist. 1 & 4)	45	21	0	24	185,943	1,895	1,758	1	0	0	15	16	72	8	32	467	579
Louisiana	50	28	0	22	287,276	1,796	2,023	0	0	0	11	11	39	9	7	243	298
Northern	28	17	0	11	89,256	988	1,089	0	0	0	6	6	13	0	4	145	162
Southern	22	11	0	11	198,020	808	934	0	0	0	5	5	26	9	3	98	136
Arkansas	13	1	4	8	49,814	348	331	0	0	0	4	4	14	1	2	75	92
Mississippi	11	3	0	8	84,982	295	264	0	1	0	4	5	12	4	0	112	128
Southeastern States	1	0	0	1	5,270	45	49	0	0	0	1	1	1	0	0	17	18
Montana	8	2	0	6	18,717	189	214	0	0	0	4	4	0	0	1	31	32
Wyoming	27	21	0	6	113,964	628	480	0	0	0	2	2	14	0	1	90	105
Colorado-Utah	7	2	0	5	23,765	246	80	0	0	0	5	5	8	0	6	114	128
New Mexico	15	11	2	2	77,711	552	509	0	0	0	1	1	13	0	9	64	86
California	53	35	6	12	222,889	1,909	1,473	2	0	0	10	12	47	0	4	384	435
Miscellaneous (No. Dak. and Md.)	3	0	1	4	16,187	67	47	0	0	1	4	5	1	0	21	46	68
Total United States	979	524	65	390	3,794,066	35,902	35,309	26	3	2	199	230	1,271	69	210	6,891	8,441
Total previous week	854	444	71	339	3,336,584			26	2	6	144	180	1,245	66	208	6,692	8,211
Total October 27, 1950	946	487	71	388	3,407,776			22	1	5	154	182	929	64	178	5,300	6,471

Service wells included: *6, †8, ‡1, §3, ¶2. **Revised.





DAILY AVERAGE PRODUCTION FOR WEEK

	Oct. 27 crude oil	B. of M. Oct. demand*	Oct. 20 crude oil
Alabama	3,100	2,400	3,000
Arkansas	76,350	85,000	77,960
California	987,300	980,000	987,100
Colorado	79,400	77,000	77,700
Eastern	63,150	62,000	59,850
Florida	1,750	1,600	1,550
Illinois	168,100	165,000	171,100
Indiana	32,500	31,000	35,300
Kansas	318,850	320,000	322,500
Kentucky	34,200	31,000	33,000
Louisiana	617,950	664,000	618,850
North Louisiana	112,900		113,800
South Louisiana	505,050		505,050
Michigan	40,200	40,000	38,700
Mississippi	101,200	105,000	104,755
Montana	24,500	26,000	25,000
Nebraska	7,400	8,000	7,500
New Mexico	144,875	156,000	144,875
Oklahoma	508,600	530,000	508,300
Texas	2,864,475	2,720,000	2,864,475
Dist. 1 (Southwest)	34,725		34,725
Dist. 4 (Southwest)	267,700		267,700
Dist. 2 (Gulf Coast)	172,300		172,300
Dist. 3 (Gulf Coast)	493,350		493,350
Dist. 5 (Eastern)	55,075		55,075
Dist. 6 (Eastern)	119,625		119,625
East Texas field	270,500		270,500
Dist. 7-C (West)	111,000		111,000
Dist. 8 (West)	1,007,600		1,007,600
Dist. 7-B (W. Central)	86,875		86,875
Dist. 9 (N. Central)	161,500		161,500
Dist. 10 (Panhandle)	84,225		84,225
Utah	3,900	5,000	3,900
Wyoming	185,700	188,000	186,000
Total United States	*6,263,500	6,197,000	6,269,415
Change from prev. week, down	5,915		
Canada	144,700		171,000

Total U. S. production January 1-October 27 †1,835,872,360 bbl.
Same period last year (crude plus cond.) 1,601,775,680 bbl.

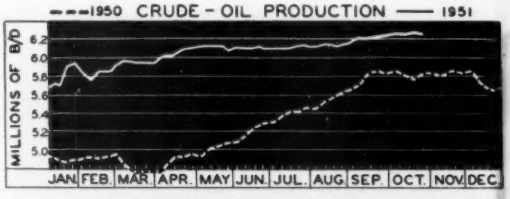
*Not including 105,905 bbl. condensate. †Including 31,502,240 bbl condensate.

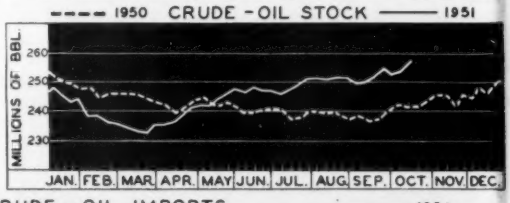
CRUDE OIL STOCKS BY STATES OF ORIGIN*

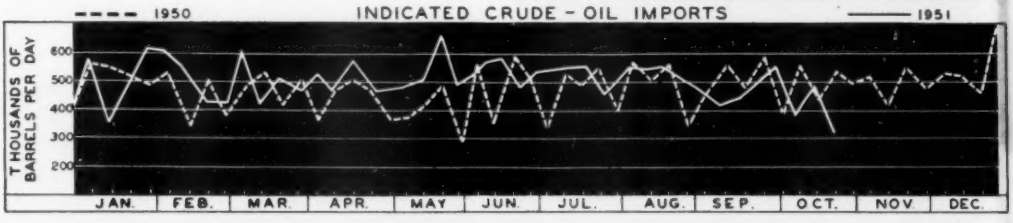
(Thousands of barrels)

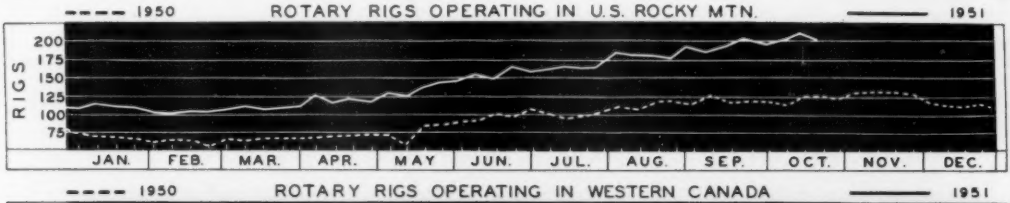
	Oct. 20, 1951	Oct. 13, 1951	Oct. 21, 1950
Pennsylvania Grade	2,023	1,960	2,256
Other Appalachian	1,396	1,597	1,500
Illinois, Indiana, Michigan	13,286	12,841	9,217
Arkansas	2,610	2,758	2,608
Louisiana	15,242	15,027	14,277
North	2,860	3,508	3,168
Gulf	12,382	11,519	11,109
Mississippi	3,476	3,340	2,597
New Mexico	7,183	7,157	6,743
Oklahoma and Kansas	39,915	39,639	37,331
Texas	123,515	120,651	119,093
East Texas	15,477	14,807	14,520
West Texas	52,995	50,937	46,447
Texas Gulf	27,319	27,013	28,863
Other Texas	27,724	27,894	29,363
Rocky Mountain	13,786	13,536	10,797
California	29,819	29,227	30,494
Foreign	5,957	6,701	6,423
Total	256,208	254,434	243,336

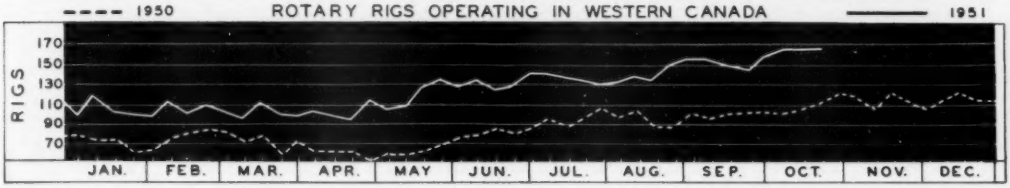
*Bureau of Mines.









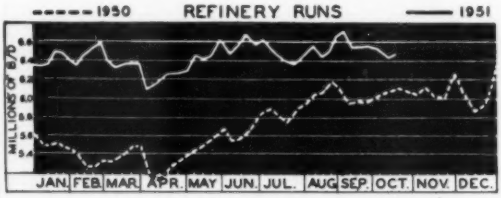


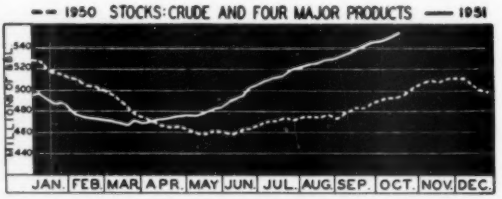
A.P.I. REFINERY REPORT, OCTOBER 20

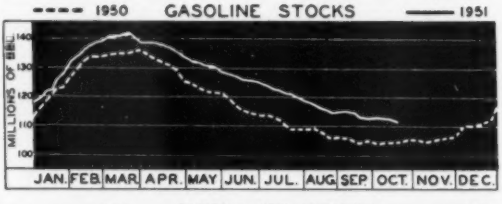
(Thousands of barrels)

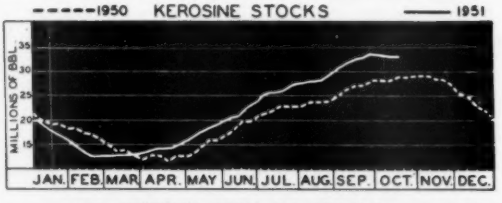
District—	Daily avg. crude runs	Daily average production				Stocks at refineries, bulk terminals, in transit and in pipe lines				Bureau of Mines, October 1950				
		Gasoline*	Kerosine	Distillate	Residual	Gasoline†	Kerosine	Distillate	Residual	Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual
East Coast	966	379.9	35.6	257.4	222.9	24,609	11,544	35,392	12,382	937	369.8	38.5	226.1	202.0
Appalachian:														
District 1	102	42.7	5.0	15.7	9.1	2,893	625	1,105	673	102	43.6	6.4	14.2	11.0
District 2	83	41.3	5.4	13.9	17.6	1,405	320	264	297	70	33.1	4.8	6.6	14.1
Ind., Ill., Ky.	1,165	632.0	69.7	211.3	161.1	22,825	7,549	21,629	6,517	1,086	572.9	62.9	190.6	155.4
Okla., Kans., Mo.	552	296.4	13.7	126.4	66.0	11,963	2,081	11,649	2,182	494	281.9	15.7	108.9	58.6
Inland Texas	255	171.6	16.0	39.4	34.3	3,657	627	1,957	1,235	215	146.4	12.7	31.8	39.2
Texas Gulf Coast	1,612	775.4	122.0	370.7	258.0	17,744	5,458	13,472	6,672	1,505	675.9	106.2	347.7	283.0
La. Gulf Coast	517	234.6	60.9	129.7	48.9	6,095	3,472	3,463	2,072	483	228.1	57.2	104.8	68.5
N. La. and Ark.	85	32.7	7.4	22.6	14.1	2,732	642	1,443	210	77	26.4	7.3	18.0	6.8
Rocky Mountain:														
New Mexico	14	8.0	....	2.9	3.9	120	....	82	32	14	7.3	.3	2.5	3.3
Other Rocky Mtn.	170	81.3	4.6	31.6	33.1	3,184	416	2,055	1,012	170	78.6	6.9	31.3	39.4
California	960	424.0	4.7	130.0	365.6	14,136	658	9,037	15,995	924	410.7	12.2	134.3	369.0
October 20, 1951	6,481	3,119.9	345.0	1,351.6	1,214.6	111,363	33,392	101,548	49,279	6,077	2,874.7	331.1	1,216.9	1,250.3
October 13, 1951	6,426	3,047.1	348.1	1,257.0	1,199.4	‡111,845	33,632	100,190	49,139	....	....	....	....	....
October 21, 1950	6,078	2,899.9	325.1	1,183.3	1,248.0	105,382	28,578	83,193	44,002	....	....	....	....	....

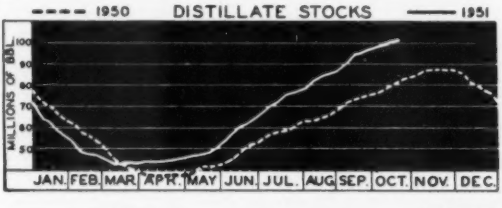
*At refineries including natural blended. †Finished and unfinished. ‡Revised.

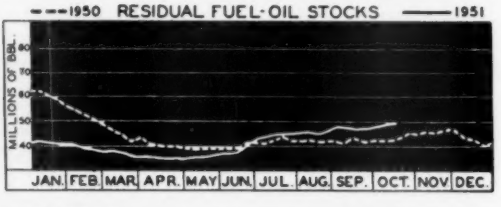


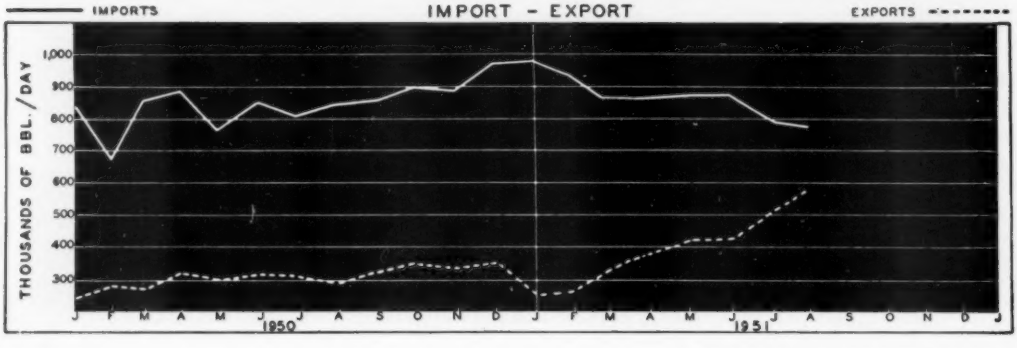












CRUDE PRICES
GRAVITY SCHEDULE

	Signal Hill, Calif.‡	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.93	....	....	....
19-19.9	1.98	...	....	....
20-20.9	2.03	$2.25	....	$2.12
21-21.9	2.07	2.27	....	2.14
22-22.9	2.12	2.29	...	2.16
23-23.9	2.18	2.31	....	2.18
24-24.9	2.24	2.33	$2.56	2.20
25-25.9	2.30	2.35	2.58	2.22
26-26.9	2.36	2.37	2.60	2.24
27-27.9	2.41	2.39	2.62	2.26
28-28.9	2.46	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.57	2.45	2.68	2.32
31-31.9	2.63	2.47	2.70	2.34
32-32.9	2.68	2.49	2.72	2.36
33-33.9	...	2.51	2.74	2.38
34-34.9	...	2.53	2.76	2.40
35-35.9	...	2.55	2.78	2.42
36-36.9	...	2.57	2.80	2.44
37-37.9	...	2.59	2.82	2.46
38-38.9	...	2.61	2.84	2.48
39-39.9	...	2.63	2.86	2.50
40 and above	...	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

East Texas†	$2.65
Kettleman Hills, California*	2.50
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	4.25
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

GASOLINE price wars at the service-station level in areas of New Jersey and Pennsylvania are reported to be easing. Improved conditions came first for counties in northern part of New Jersey where some suppliers raised tank-wagon prices about 3 cents a gallon.

Atlantic Refining Co. announced an increase in tank-wagon price of regular gasoline in the Philadelphia area amounting to 4.5 cents a gallon to bring the posted price to 14.3 cents. This compares with a posting of 14.7 cents before the price wars started. Regular grade was raised to 14.3 cents in other areas of Pennsylvania.

The residual fuel market in New York Harbor continued to be slightly soft with some distress material reported. No general shading of No. 6 prices has been noted, and the volume of distress material has been limited. A spot sale of 20,000 bbl. was reported sold at 5 cents under the low. The sag in the market has been due to drop in sale of residual for bunkering and to the relatively mild weather in recent weeks. Bunkering was off because of the maritime strike.

The Office of Price Administration authorized increases in the ceiling prices of kerosine, distillate-type burning oils, and diesel fuel for tank-wagon delivery in midwestern states. Effective October 30, resellers in Wisconsin, Minnesota, North Dakota, South Dakota, Iowa, and Kansas are permitted to add .5 cent a gallon to the former ceiling based on selling price in effect December 13, 1950. An increase of .3 cent was granted resellers in Arkansas, Indiana, Missouri, Nebraska, Michigan, and Illinois with the exception of metropolitan Chicago.

Correction.—Because of a transposition error, Grade 26-70 natural gasoline for North Texas was printed as 7⅝ cents a gallon in the price table of the October 4 issue. The price should have been 5⅞ cents.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of October 29, 1951. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10¼-10½	12-12.75	10¾-11
Premium gasoline, 86-88 octane	11¼-11½	13.5-13.75	11¾-12
42-44 w.w. kerosine	9-9⅜	10	9
No. 2 straw fuel oil	8-8½	9	8
No. 6 residual	$1.65-1.75	$2.45-2.60	$1.75-1.90

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	6⅛	6⅜	6⅝
Grade 18-55	8.25	7.75	8.0

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13-13.5
750 vis., No. 3-4 neutral	16
2,000 No. 5-6 neutral	18-19

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	29-30
200 vis., No. 3 neutral, 0-10 pp.	17.5-18.5

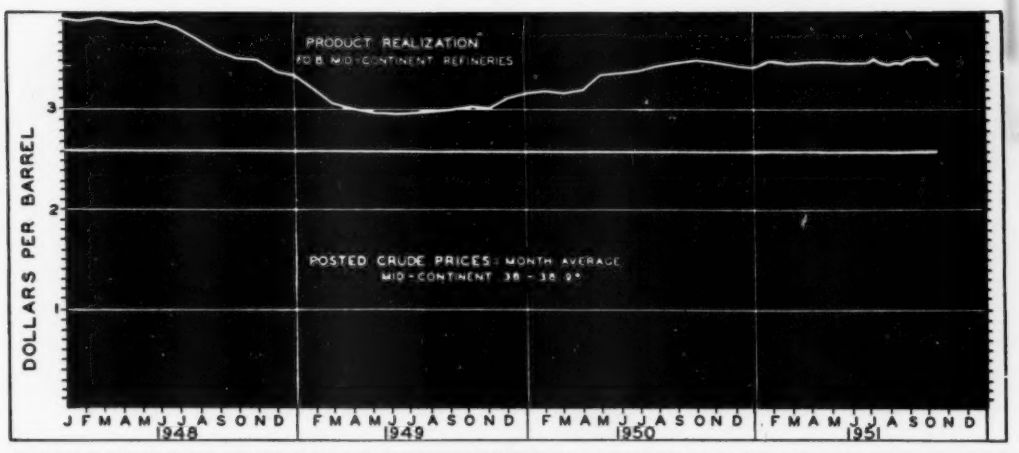
Western Pennsylvania

145-155 vis., 10 p.t. bright stock	32.5
180 vis., 0 p.t. neutral	31.5

WAX

Mid-Continent

132-134 A.M.P.	6.0



In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil. Realization averaged $3.45 for week ended October 20, $3.46 for previous week, and $3.50 for October 1950.

on these Worthington turbines as on numerous others, it's ROSS EXCHANGERS

Top left: One of two Worthington 1500 KW. non condensing, automatic extraction type turbine generators supplying electric power for New Mexico gas company. Both equipped with Ross oil coolers.

Top right: 900 hp Worthington turbine driven water works pump (complete with gear) operating in a Michigan municipality. Equipped with a Ross oil cooler.

Lower left: Two 1140 hp Worthington condensing steam turbines driving centrifugal blowers in New Jersey gas and electric utility. Both equipped with Ross oil coolers.

Lower right: 5000 KW Worthington condensing type turbine generator supplying power for Michigan cement company. Equipped with Ross oil cooler.

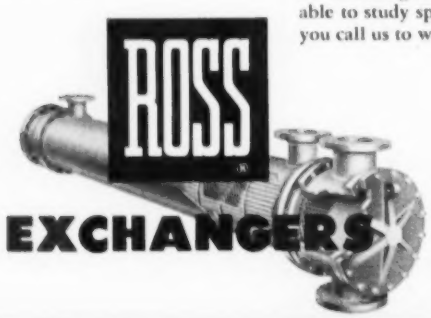
If you'd ask Worthington Pump and Machinery Corp. why it uses Ross lubricating oil coolers so extensively as factory-furnished accessories with its turbines, you would likely hear a number of reasons. For instance:

Standardization simplifies engineering . . . Wide selectivity of good materials makes them suitable for most conditions . . . Diversification of standard types covers numerous customers' requirements and specifications . . . Engineering data and details of construction are readily available . . . Prompt, dependable deliveries are assured.

But, they all boil down to one simple fact: *Ross Exchangers are fully standardized.*

Yes, Ross standardization makes a big difference to Worthington, just as it does to most other leaders in the turbine and diesel field. It's Ross standardization of design, of sizes, of component parts that makes selectivity and uniformity *a certainty!*

In Worthington's own words: "Competent Ross Engineers are available to study special problems and to make recommendations." Will you call us to work with you?



ROSS HEATER & MFG. CO., INC.

Division of American Radiator & Standard Sanitary Corporation

1417 WEST AVENUE BUFFALO 13, N. Y.

In Canada, Horton Steel Works, Limited, Fort Erie, Ont.

Serving home and industry

AMERICAN-STANDARD · AMERICAN-BLOWER · ACME CABINETS · CHURCH SEATS · DETROIT LUBRICATOR · KEWANEE BOILERS · ROSS HEATER · TONAWANDA IRON

EQUIPMENT MEN . . . in the News

Boudreau Made Public Relations Director

James E. Boudreau has been appointed director of public relations of Ethyl Corp., succeeding Ralph C. Champlin, who has resigned to become vice president in charge of public relations and advertising for Pennsylvania Railroad.

Until his recent appointment, Boudreau was sales manager in charge of marketing services for Ethyl. He has been with the company 21 years, starting as a sales representative in New York state.

Sid Richardson Names Pearcy to Sales Staff

Frank Andrews, vice president of Sid Richardson Carbon Co., recently announced the appointment of Evert Pearcy to its sales department. Pearcy will make his headquarters in the general sales office, Akron.

Pearcy was formerly employed by Ferro Enamel Corp. as a sales engineer. During 6 years with this company he sold and supervised the installation of Ferro units in this country and abroad.

Klinger Representative On Extended Trip to U. S.

Charles Soukup, managing editor of Richard Klinger, Ltd., Sidkup, Kent, England, arrived in the United States on October 11 for a 2-month visit. During Soukup's visit Klingert hopes to reintroduce its products to American industry.

Soukup will concentrate on the eastern states, and the company anticipates opening branch offices shortly for later production in this country.

Klinger is the manufacturer of compressed asbestos fiber jointing, "Klingerit," and other products such as the Klinger reflex level gage, the "Klingerflow" seatless piston valve, and the Klinger "sleeve-packed" cock.

Core Lab Services Now Available in Kansas

Core Laboratories, Inc., recently announced the opening of a new laboratory at 1322 Tenth Street, Great Bend, Kans. Services from this point will include off-location core analysis, on-location well logging and core analysis, and diamond-coring-equipment rental service.

Clark Bros. Announces Three Promotions

A. G. VAN CAMPEN

Clark Bros. Co., Inc., N. Y., manufacturer of heavy-duty compressors for the petroleum, chemical, and industrial markets, has announced the following appointments: A. G. Van Campen has been appointed district sales manager of the Tulsa Mid-Continent territory; Robert C. Smith, Chicago district sales manager, and M. G. Daniels, industrial sales engineer, Chicago.

R. C. SMITH

M. G. DANIELS

Van Campen's past 15 years' experience with Clark includes a number of years on experimental and technical work. His sales experience consists of 4 years in the New York office and more recently as district sales manager of the Chicago territory. He will assume the Tulsa position vacated by the appointment of George W. Probst as western regional sales manager.

Smith spent a number of years on the Pacific Coast with a major oil company as a project engineer on refinery construction. After several years in sales work with a major manufacturer of heavy equipment for the petroleum and gas industries, he came to Clark where he has been working on compressor applications for every type of service. Smith will be in charge of the Chicago territory and will succeed Van Campen.

Daniels has a background of 8 years of selling compressors, pumps, and engines to the industrial markets. He has been with Clark for several years, and in his new position will concentrate his efforts on the industrial compressor applications in the Chicago territory.

Sturges Named Purchasing Agent for Mid-Continent

R. H. STURGES

R. H. Sturges, former assistant merchandising manager and operations auditor for Mid-Continent Supply Co., has been appointed purchasing agent, according to an announcement made recently by Ken W. Davis, Mid-Continent president and general manager.

Sturges joined Mid-Continent's forces in 1944 as assistant department manager, merchandise department, and was then successively made assistant merchandising manager and operations auditor. Prior to his association with Mid-Continent, he had been a field store auditor for another supply company.

Headquarters for purchasing agent activities will be Mid-Continent's general office building in Fort Worth.

Agreement Is Announced By Byron Jackson Co.

Byron Jackson Co. has announced that an agreement has been made with Specialty Sales & Service, Inc., Tulsa, whereby that firm will handle all sales of the Dempsey hydraulic oil-well pump as the exclusive sales agent for Byron Jackson Co., Dempsey Division, in the Mid-Continent area.

M. L. WALRAVEN

W. R. FOSTER

Under this agreement Specialty will continue the same service it performed as representative of Dempsey Pump Co. of Tulsa prior to its recent purchase by Byron Jackson.

Specialty plans to undertake an expansion program which will assure adequate representation of Dempsey equipment in all active areas in Texas, Oklahoma, Kansas, and all other oil-producing states in the Mid-Continent area.

The first step in this expansion pro-

gram was taken on September 1 with the opening of an office in Fort Worth headed by W. R. Foster. H. W. Wood will continue in charge of the company's office in Odessa, Tex.

Specialty Sales & Service, Inc., is headed by M. L. Walraven, Jr., president, and W. R. Foster, vice president.

Welex Names McLemore To Executive Post

R. H. McLEMORE

Robert H. Mc Lemore of Welex Jet Services, Inc. Fort Worth, was elected to the post of executive vice president and general manage of the company at a recent meeting of the directors.

McLemore formerly was vice president of operations. Before joining Welex in 1945 he was district engineer for Sun Oil Co., Dallas.

At this same meeting Sterling Holloway, Fort Worth, president of Continental Life Insurance Co., was elected as a new director of Welex.

BS&B Appoints L. N. Tidd Manager of Contract Sales

L. N. TIDD

Henry A. Ruysser, Jr., vice president and general sales manager of Black, Sivalls & Bryson, Inc., has announced the appointment of Lu N. Tidd as manager of contract sales for the Oklahoma City plant.

Tidd has been officer of the company since 1950, in the capacity of assistant treasurer and assistant secretary.

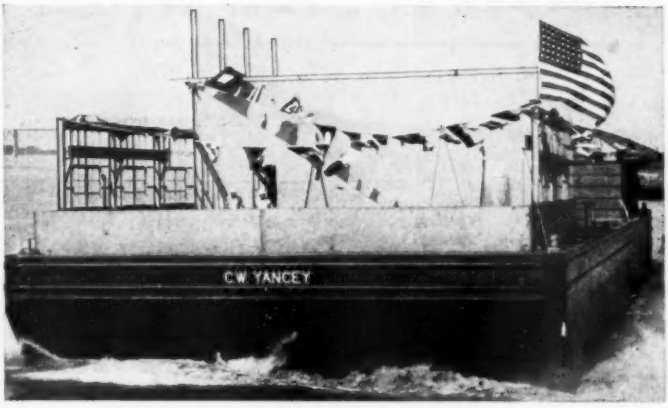
Before his present appointment, Tidd was general credit manager at BS&B for 5 years.

Treybig Forms Louisiana Exploration Co.

Louisiana Exploration Co., a seismic exploration contracting company, specializing in salt-dome and fault problems common to Gulf Coast geophysics, has opened headquarters in New Iberia, La.

B. H. Treybig, Jr., head of the organization, has had wide practical experience in seismic exploration, including extensive work in the United States, South America, and Canada. He was geophysical supervisor for the Louisiana division from 1944-1950 and assistant to the geophysical division manager until his recent resignation to form Louisiana Exploration Co.

Avondale Launches Fourth Submersible Drilling Barge



Ceremonies for the launching of the new submersible drilling barge built by Avondale Marine Ways, Inc., for Rowan Drilling Co., Inc., Fort Worth, were attended by C. L. Rowan, president of Rowan; M. G. Rowe, vice president in charge of drilling operations; L. J. Hartmangruber, division drilling superintendent, and J. C. Magner, assistant superintendent.

Avondale Marine Ways, Inc., in late August launched a submersible drilling barge for Rowan Drilling Co., of Fort Worth, which represents the fourth barge of this type built by Avondale for Rowan within the past 15 months.

C. W. Yancey, as the new barge is known, will be used in the marsh lands of Louisiana.

The C. W. Yancey, like those which have preceded it, is one of the largest drilling barges ever built and is a self-propelled unit. The dimensions are: length 200 ft., beam 54 ft., depth 12 ft. It has a draft of 6 ft. which permits accessibility to extraordinary shallow locations. Fuel and fresh-water capacity are adequate for prolonged operations. In addition, a full supply of pipe and other materials required is made possible by the extra-large capacity of the barge itself.

The C. W. Yancey is powered by five diesel-electric generators developing a total of 1,200 kilowatts. A 20-ft. derrick floor elevation is installed with a clearance of 14 ft. under a rotary beam which facilitates the handling of heavy well-head control valves.

English Joins Pipe Protection Organization

Pipe Protection Service, Inc., Elizabeth, N. J., has made the announcement that E. Rowland English recently joined its organization as vice president. He will be in charge of sales and will also serve as assistant general manager.

Pipe Protection operates coating and wrapping plants at Elizabethport, N. J., Lowell, Mass, and at customers' job sites.

English was formerly eastern division manager for H. C. Price Co., Somastic Division.

J. T. Gossett Named Board Chairman

At a recent meeting of the directors of Cenco Corp., the parent stockholding company, and Central Scientific Co., Chicago, John T. Gossett, president of Central Scientific Co., was elected chairman of the board of directors of both companies, succeeding to the responsibilities of the late chairman, E. Perry Holder.

Caterpillar Names Fair to Head Board of Directors

Harry H. Fair, of San Francisco, was elected chairman of the board of directors of Caterpillar Tractor Co. at a recent meeting of the board in San Francisco. He succeeds C. L. Best, deceased.

Elected to the board to replace Best was A. H. Brawner, president of W. P. Fuller & Co., San Francisco, Pacific Coast glass and wallpaper firm.

Fair's connection with the tractor business began in 1918 when he became a stockholder and director of Best Tractor Co., one of the constituents of Caterpillar. He was the prime mover in the formation of Caterpillar and has continuously been on its board and executive committee.

(Continued on page 128)

Your MARKET PLACE FOR THE OIL AND GAS INDUSTRY...

CLASSIFIED ADVERTISING

UNDISPLAYED CLASSIFIED 12c a word one issue. 10% Discount three or more issues. $3.00 minimum charge. Blind Box in our care counts nine words. Payable in Advance.

DISPLAY CLASSIFIED
$12.00 a column inch one issue . . .
10% Discount three or more issues.

EQUIPMENT FOR SALE

ADDING MACHINES, Typewriters wholesale. Enclose 10c for catalogues. Apple, 993A, Westchester Ave., New York City 59, N. Y.

FOR SALE: 1 Buckeye Model 11 trencher with Buda gasoline engine. Contact Natural Gas Service Company of Arizona, Box 127, Coolidge, Arizona, Telephone 4481.

FOR SALE: Model 61 Wichita Spudder, complete with 150 H.P., LeRoi Drilling Engine, all tools, dog house, light plant, and Shear Pole Mast. Rig is mounted on 12" I Beam Skids. Located in West Texas. Box E-415, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Seamless casing and tubing new and second hand. Phone Rogers Pipe and Supply Co., Tulsa, Okla.

R. L. Double Drum Cardwell Spudder, complete with tool, Dog House and mast. Telephone 6-9234, Oklahoma City, Oklahoma.

ONE 65-HP. Franklin Valveless Gas Engine, One 4½ x 18 x 12 two stage Worthington Compressor, One 4½ x 9 x 10 two stage Bessemer Compresser, and One 50 HP. Superior Gas Engine. All good condition. Exceptionally low prices. The B. Levy Estate, Titusville, Penn.

FOR SALE: Two 3000 bbl. Butler bolted tanks good condition. Can ship immediately. Wentz Fuel Oil Company, 1012 No. 16th St., Lincoln, Nebraska.

SPECO TOOL COMPANY

Oil Field Maintenance & Repair Machine Shops

We buy and sell all types of used oilfield equipment.

Salem, Ill. Phone 915 — **Crossville, Ill.** Phone 841

The Flood Is Over at Sonken-Galamba

Thanks to our friends, suppliers, neighbors, customers and competitors we have weathered the worst flood in Kansas City history. We are now back in our offices and plant again with even better facilities to serve you.

THANKS!

WAREHOUSERS-DEALERS-BROKERS-EXPORTERS
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Aluminum—Steel and Stainless Steel
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Please continue to submit your requirements or offerings

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SONKEN GALAMBA Corporation
Kansas City 18, Kansas

(X-775)

EQUIPMENT FOR SALE

USED ROTARY AND CABLE TOOL DRILLING TOOLS, WIRE LINES, E. A. KELLY, BOX 861, OKLAHOMA CITY. PHONE 5-6467.

FOR SALE: One Bucyrus-Erie 36 L Spudder three and one-half years old. Complete top and bottom tools 15½ to 5½. Also complete tailing in tools. All in first-class condition. List on request. J. E. Griggs, 310 East Third St., Mt. Carmel, Illinois. Phone 950.

FOR IMMEDIATE DELIVERY: #1 Seamless Used Casing and Tubing. 10,000' 5½" O.D. 14#-15.50#-17# 8 rd. thd. R-2. 3,000'—7" O.D. 17# 3 rd. thd. R-2. 10,000'—2⅜" O.D. 4.60# Non-Upset 10 rd. thd. R-2. #1 Lapweld Used Casing and Tubing: 10,000'—5½" O.D. 17# 11½ thd. R-1. 5,000'—6⅝" O.D. 13#-17# 11½ thd. R-1. 5,000'—7" O.D. 17# 10 V thd. R-1. 10,000'—2⅜" O.D. 4.50# 11½ thd. R-1. 10,000'—2⅜" O.D. 3.75# T&C Used Line Pipe #1 & 2 Grades. The Buckeye Supply Co., 18 Harrison Street, Zanesville, Ohio.

Gaso Dupiex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

EQUIPMENT FOR SALE

PIPE

ALL SIZES: LINE PIPE AND CASING, TANKS, AND OILFIELD SUPPLIES. EDCO PIPE & SUPPLY CO., PHONES 933 OR 1298, DRUMRIGHT, OKLA.

FORT WORTH Jumbo Spudder with or without tools. No Engine. Near Oilton, Oklahoma. Just finished 3000 ft. hole. Priced to sell. Doak Drilling Co. Write or Phone, 1579 Bristow, Oklahoma.

ONE Cardwell Double Drum Draw Works, R.L. 603 powered with W.A.K.U. Waukesha Motor Serial No. 731319. One 5" x 10" Gaso pump, Serial No. 16305, powered with Climax motor Serial No. 14423. One 4 way manifold complete. One 3 shiv booster traveling block. One 7 in. Cameron Blowout Preventer. One Franks swivel and 3" x 36' Kelly. One 96' Steel drilling mast. One 7' x 16' x 24' Steel sub-structure. One ⅝" x 8500' sand line. One ⅞" x 1500' drilling line. One steel tool house & complete set of tools. Rig now working. Phone 1391, B. M. McGraw, Seminole, Oklahoma.

FOR SALE

1 Good Used 136' Ideco Derrick with Substructure and #350 Oilwell 6 Sheave Crown. Almost New. Priced for Quick Sale.

BEACON SUPPLY COMPANY
Box 398, Pampa, Texas — **Ph. 3377**

FOR SALE

DON'T OVERLOOK AN OFFERING LIKE THIS

IMMEDIATE DELIVERY — SUBJECT TO PRIOR SALE

OIL OR GAS FLOW LINE FOR LOW OR HIGH PRESSURE WORK

NEW SEAMLESS PIPE

50,000' 2" (2⅜" O.D. x .220/.250" Wall) 5.43# extra heavy 26'-40' lengths.
50,000' 2½" (2⅞" O.D. x .220/.250" Wall) 6.7# standard Blk. 20'-30' lengths.
50,000' 2½" (2⅞" O.D. x .270/.330" Wall) 8.56# extra heavy black 20'-30' lengths.
10,000' 4" (4½" O.D. x .375" Wall) 16.5# extra heavy black 24'-32' lengths.
6,500' 8⅝" O.D. x .470" Wall 38.42# excellent No. 1 used seamless 40' Joints.

OIL WELL CASING & TUBING

50,000' 1" (1.315" O.D. x .133" Wall) 1.8# New Seamless Oil Well Tubing, T&C with long tubing collars & thread for Jet purposes.
50,000' 2⅜" O.D. 4# good used lapweld rg. 1 T&C 11½ V thrd. tubing.
10,000' 2⅞" O.D. 6.4# good used lapweld rg. 1 T&C 10 V thrd. tubing.
20,000' 5½" O.D. 14# good used lapweld rg. 1 T&C 11½ V thrd. casing.
5,000' 8⅝" O.D. 24# good used lapweld rg. 1 T&C 8 V thrd. casing.

OTHER SIZES RANGE FROM ¼" TO 36" O.D.

NEW AND USED CASING, TUBING, LINE PIPE & SEAMLESS TUBING

FOR FULL DETAILS, WIRE OR PHONE AT ONCE

A. J. STRUBEL, Broker

4946 Murdoch, St. Louis Mo. SIdney 1791 (Day Phone) HUdson 8152 (Night Phone)

EQUIPMENT FOR SALE

7 ACRES OF OIL FIELD BARGAINS. Waukesha GAK 165HP Drilling unit, good, $2,500; 3 OCS chain driven sand reels, calf wheel, 6" x 5" Newton falls rig, timbers, good wheels, 14 inch brake wheel; Stems, bits 18" to 5", bailers, sand pumps, everything in cable tools; National No. 2 drilling machine only $1,500. Write, phone or call McGinnis, Tri State Tool & Supply Co., Phone 7-5121, 36th at Jefferson, Box 827, Parkersburg, West Va.

KEYSTONE spudder, trailer mounted, truck and tools. Located Washington County, Oklahoma. Working on seven hundred foot well. Box E-385, The Oil and Gas Journal, Tulsa, Oklahoma.

I OFFER 1,000,000 gallons lubricating oil for cash. Low price. Write for details. John Stouppas, 175 E. Long St., Columbus, Ohio.

CATERPILLAR D 13,000 dual fuel power unit. 95% new, run only 800 hours. $5500.00. Wesley Steinhoff, Council Grove, Kansas. Phone 213.

OILFIELD ENGINES
Because of electrification of our leases, we offer 23 FM 118 and 208 engines, all in good condition, located in Stinnett, Texas, field. Also 1 used Wilson Senior Pulling Unit in good condition. For particulars: J. Ray Mendenhall, 77 West Washington St., Chicago, Illinois.

FOR SALE: 145′ of 2" J-55 upset Tubing; 118′7" of 5½" seamless casing; 625′ of ⅞" sucker rods; 1725′ of ¾" sucker rods with huber scrapers. Contact Acme Equipment Co., Inc., 126 S. Clinton St., Chicago 6, Illinois.

SPUDDERS. BUCYRUS, Wichita, Fort Worth, also rotaries and core drills. Good used equipment, tools, pipe, cable. Everything for well drilling. Fishing tools rented Pressey & Son, Pueblo, Colorado.

FOR SALE: Approximately 40,000 ft. of 2⅞" O.D. Range 2, 10 and 8 round thread tubing. Suitable for shallow wells, or No. 1 line pipe. Located in Oklahoma City. Call Moran Pipe & Supply Co., Inc. Phone 3-5595, or write Box 2686, Tulsa 1, Oklahoma.

NEW

HIGH PRESSURE HOSE

Perfect Condition

6 inch diameter, 20 ft. long. Heavy duty with standard built-in nipples and standard 6 inch flanges at each end.

Price $200.00 each*

4 inch diameter, 30 ft. long. Heavy duty with brass couplings.

Price $200.00 each*

This is choice material, neoprene and inner steel coil, and is recommended for immediate and future use. At the above price it will not be available at less than three times our price when our present stock is exhausted. Right now you can get any quantity up to a carload.

A few 6" with aluminum nipples and flanges at $250.00 each.

*F.O.B. New Orleans

G. Peters

430 Dauphine St.

NEW ORLEANS 16, LA.

EQUIPMENT FOR SALE

FOR SALE: Ideal slush pump, Model C-150. Melton Supply Company, Seminole, Oklahoma.

AS IMPORTERS of Steel we can furnish you with European or Japanese Steel Products of all types. Let us have your inquiries. Hemisphere International Corp., 1404 Hibernia Bank Bldg., New Orleans, La.

WILSON Mogul draw works, 145 HP Waukesha, unitized on steel skids mounted on 50 ton tandem lowboy, 50′ double poles 100,000# capacity, steel substructure, rotary table, blowout preventer, swivel, light plant, 7 x 14 mud pump. Rig now working. Wilson Super draw works, 140 Waukesha, 56′ double poles mounted on 10 ton Mack truck, 6 x 12 mud pump, steel substructure, rotary, swivel. Both rigs have all tools and accessories to drill to 3500′ or workover to 8000′. Gardner-Denver 5 x 8 High Pressure mud pump, 140 HP Waukesha. Wilson Mogul Coring Unit complete with Ford Industrial Motor and Transmission, 7500′ line, Baash-Ross Coring Block and Reed wireling core Barrel. Price $60,000.00 for entire lot or prices quoted on individual items. Driscoll Drilling Company, Box 388, Driscoll, Texas.

PIPE LINERS—3800—6" Short Dresser Couplings w/ Bolts Less Gaskets. 1,500 Available for Immediate Delivery. Printy Pipe & Supply, Cut Bank, Montana.

JENSEN 18 D 30-44 hp. pumping unit, with or without 20 hp. Wagner Electric Motor. 2626 ft. 6-in. O.D. 15 lb. seamless casing. 3200 ft. 5½" O.D. 14 lb. Seamless Casing. Tulsa Supply Co., P. O. Box 294, Tulsa, Oklahoma.

SPEED STAR 71, fully equipped. Truck mounted. Immediate delivery. G. J. Stumpff. Box 1107, Goodyear, Arizona.

SPUDDER Cardwell R L. Complete 5½ and 6" with 6500 ft. new drilling line. 5500 ft. sand line all in first class condition. Three and one-half years old. Phone 310. Kay Drilling Company, Box 273, Ulysses, Kansas.

JACKS, Jacks, Jacks—I have a limited number of new individual pumping units; also some used 8" pipe. A. R. Daniel, Garnett, Kansas.

FOR SALE: ONE 3A National Spudder with a Young drilling Clutch, with a JL 1335 Buda Engine. Without tools. C. L. Hinds, Box 194, Ulysses, Kansas. Phone 251.

FOR SALE: Complete rotary rig. Two pole telescope mast. Wilson-Snyder Mud Pump. Good condition and ready to go. Write Bier & Vanderpoel, Box 693, Plainview, Texas.

FOR SALE: One super model Wilson single drum servicing unit, 80 hp. Waukesha 1,000′ wire, all tubing tools, mounted on GM 4-wheel drive truck. $3500. Phone Rogers Pipe and Supply Co., Tulsa, Okla.

WANT EQUIPMENT: Did you find the equipment you wish to purchase in this column? If not, use an "Equipment Wanted" classified advertisement to find it. It is available somewhere and Journal classified advertisements will find it. See box heading for classified rates, or write The Oil and Gas Journal.

EQUIPMENT WANTED

WANTED: Triplex Type Pumps, minimum 500 barrels per day capacity at 1,000 PSI and 0 to 10 PSI suction and up. 1" Regular Black Line Pipe; 1" long collar line pipe and 1¼" upset tubing. Must be in good condition. Lynch Oil Company, P. O. Box 814, Evansville, Indiana.

EQUIPMENT NOT IN USE: Did you find a buyer in this column for the equipment you have for sale. Someone wants it and an "Equipment For Sale" classified advertisement in the Journal will find a buyer. See box heading for classified rates or write The Oil and Gas Journal.

1950-1951

Bucyrus-Erie Spudder

either a 48-L or 36-L.

KETA GAS & OIL COMPANY
Terminal Building Bradford, Penna.

EQUIPMENT WANTED

WANTED: Suitable unitized portable drilling rig; 3,000 to 3,500 foot capacity; complete with 3,500 feet of 2½" EUE drill pipe, min. 7½ x 12 pump; mast, etc. Send full details and quote price F.O.B. loaded cars, to American Northland Oil Company, 127 Montgomery St., San Francisco, Calif.

WANTED IMMEDIATELY: Good used or new 8⅝" 24 lb. and 7" 26 lb. casing. Prefer location in or near Pennsylvania. Box E-416, The Oil and Gas Journal, Tulsa, Oklahoma.

WE BUY drilling equipment, machines, cable tools, pipe, etc. Turn your surplus equipment into cash. Pressey & Son, Pueblo, Colorado.

WILL TRADE for new pumping units, 300′ 16⅛" Casing; 1400′—13⅜"; 2000′—10¾"; 4000′—8⅝"; all good threads—good condition. Will also trade excellent 3-A National Machine complete with diesel power, tools, etc.—want new pumping units. Address Box 285, El Dorado, Kansas.

HELP WANTED

KEY Seismograph Personnel Needed by Established and Expanding Seismograph Company. Box E-264, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Operator to develop Oil Lease (Incorporated, no stock sold), located by noted Geologist, Geophysicist and Government Analyst (now deceased), well unfinished. Particulars, H. C. Roffey, Columbia, Ky.

RESEARCH Engineer — 26-40 — B.S., and preferably an advanced degree in petroleum or mechanical engineering. Must be widely experienced in well completion practices. Will be responsible for research program in well completion practices and well mechanics. Salary open. Location — Ponca City, Oklahoma. State age, experience, education, and salary desired in opening letter. Write direct to Personnel Records Division, Continental Oil Company, Ponca City, Oklahoma.

EXPERIENCED petroleum Chemist wants position. Research, supervision or control. Box E-433, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED—Refinery instrument man. Cat cracking experience necessary. New Mexico Asphalt & Refining Company, P. O. Box 367, Artesia, New Mexico.

ENGINEERS, Executives, Technical Men. Salaried positions—$3600 to $30,000. This confidential service for outstanding men who desire a change of connection. Will develop and conduct preliminary negotiations without risk to present position. Send name and address for details. Tomsett Associates, 334 Frick Bldg., Pittsburgh 19, Pa.

WANTED: Petroleum Engineer with ten or more years experience primarily Gulf Coast production — some other parts of Texas. Also oil operating superintendent ten or more years experience. Substantial independent producer. Give experience, salary contemplated, other details. Box E-432, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Rotary Driller to use portable equipment. Drilling Water Wells Eastern States. State qualifications and requirements. Box E-427, The Oil and Gas Journal, Tulsa, Oklahoma.

RESEARCH Metallurgist—26-40—B.S., and preferably advanced degree in metallurgy or metallurgical engineering. Should have experience with all types of laboratory apparatus for metallurgical study and experience in selecting materials for all types of services. Corrosion studies, materials selection, and anlysis of failures will constitute the bulk of the work. Salary open. Location—Ponca City, Oklahoma. State age, experience, education, and salary desired in opening letter. Write direct to Personnel Records Division, Continental Oil Company, Ponca City, Oklahoma.

PETROLEUM, mechanical, civil engineers out of school under 2 years. Petroleum Engineers about 5 years experience. Geologists under 3 years experience having 1 year graduate work or 50 semester hours geologic courses. Experimental geophysicists. Topographical draftsmen. Experienced oil-well supply pricers and salesmen. Young engineers for manufacturer's training program to become salesmen in southwest. No fees. Oil Industry Employment Service, 405 Tuloma Bldg., Tulsa., Okla. 4-5974.

HELP WANTED

MECHANICAL engineer with degree, three years model shop experience. P. O. Box 2486, Kansas City, Mo.

RESEARCH Group Leader and Research Engineer — 26-40 — B.S., and preferably a Ph.D. in physical chemistry, physics, petroleum engineering, or chemical engineering. Should have experience in reservoir engineering, reservoir mechanics research, or fluid flow research. Well be responsible for research program in multiphase flow and other aspects of reservoir mechanics. Salary open. Location—Ponca City, Oklahoma. State age, experience, education, and salary desired in opening letter. Write direct to Personnel Records Division, Continental Oil Company, Ponca City, Oklahoma.

HELP WANTED

OIL SECRETARY—Age 35 to 45, for independent oil company in Oklahoma City. Must be expert stenographer, well experienced in oil production and operations. Must have excellent character and references. Sal. $350. per mo. with raises commensurate with ability. P.O. Box 1824, Oklahoma City.

WANTED: Engineer with natural gasoline plant or recycle plant experience in process design. Location, Fort Worth office of expanding progressive independent oil company as assistant to Chief Engineer. State salary expected. Give experience, age, family, etc. Information held confidential. Box E-424, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

NATIONALLY known manufacturer of oil field specialties has opening for commission representative in Michigan, Ohio, Pennsylvania and West Virginia. Products are marketed only through recognized jobbers but contact with both jobber and consumer is necessary. Representative must be of highest caliber and must be well established in area. Box E-431, The Oil and Gas Journal, Tulsa, Oklahoma.

THE POSITION YOU WANT: Oil industry companies are looking for men to fill every conceivable kind of position. If you didn't find the position in this column that you are looking for, use a "Situation Wanted" classified advertisement to state your qualifications. Some company is probably looking for your ability. See box heading for classified rates or write The Oil and Gas Journal.

BLAW-KNOX CONSTRUCTION CO.

Opening on staff for qualified process Design Engineers. Three to five years industrial or contracting experience with refinery processing units required. Also opening for Cost Estimators. Position is in the Tulsa Office which is an aggressive, rapidly expanding organization. Unlimited opportunities to do engineering work on all types of processes. Outline technical training, experience, age, present position, and salary desired. Include recent snapshot if available. Send letters to:

Personnel Department

Chemical Plants Division

540 East Fifth Street, Tulsa, Oklahoma

OVERSEAS POSITIONS

An American oil company in South America has positions open for qualified technical personnel.

Refinery Chemist—Must have a college degree and a minimum of four years' experience in oil refinery control laboratory. Experience in manufacture of lube oils and greases desirable. Single man preferred.

Mechanical Engineers—Engineering degree and minimum of five years' experience in mechanical drafting and design of oil refinery or chemical plant process piping and equipment.

Electrical Engineers—Must have E.E. degree and five years' experience in design, operation, and maintenance of electrical installations in oil refineries or chemical plants including generators, motors, motor control, and switch gear.

Corrosion Engineers—Degree and minimum of five years' experience in corrosion engineering. Will be required to make studies and investigations of causes and nature of corrosion pertaining to equipment utilized in oil producting operations.

Maintenance Engineers—Mechanical or Electrical Engineers with a minimum of five years' experience in a modern oil refinery to work in coordination and supervision of maintenance and construction.

Pipeline Engineers—Degree and four to ten years' experience in design and construction of pipelines, gathering systems, pump stations, tank farms and terminals.

Drilling Engineers—Degree and minimum of three years' experience required. Will be required to maintain and analyze records on drilling equipment performance and make recommendations to improve the efficiency of drilling operations.

Equipment Inspectors—Graduate Engineers with minimum of four years' experience in refinery equipment inspection required.

Pipeline Foreman—Will be required to supervise maintenance and construction of trunk pipeline system.

Write giving age, education, marital status, and details of previous experience. Your communication will be held in strict confidence.

BOX 308-S

RADIO CITY STATION

New York 19, New York

SITUATIONS WANTED

FORMER Independent Oil Operator ten years, with legal education, plus eight years Wall Street experience, desires connection raise funds exploratory well drilling from excess profits taxpayers. Box E-396, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER: Desires stateside or foreign employment, three years experience, exempt from military service. Box E-411, The Oil and Gas Journal, Tulsa, Oklahoma.

INDEPENDENT OPERATOR — Geologist and geophysicist with over twenty years exploration experience with major companies and unusual discovery record desires connection with aggressive independent. Box E-410, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE petroleum engineer desires field work with independent. No field experience. Presently employed and for past two years as reservoir engineer with major oil company. Veteran, 32, married. References. Box E-418, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED EXECUTIVE ADMINISTRATIVE ASSISTANT GRADUATE PETROLEUM ENGINEER, 39 years of age, 18 years experience covering Planning, Engineering and Administrative assignments in the Drilling, Producing and Pipeline Divisions of the Oil Industry including Purchasing, Inventory, Material Control and Sales Duties. Staff assignment P.A.W. programing materials last war. Presently employed by Industry in Supervisory capacity; desire change, must be permanent, with aggressive and well established Independent Oil or Gas Company. Prefer to locate in Houston. Box E-390, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 131, Ph. No. 131, Hobbs, New Mexico.

ENGINEER Available to Manage Refinery. Box E-430, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST, with extensive experience in oil and gas exploratory work, in foreign as well as domestic fields, for major as well as independent oil companies; doing surface, detail and reconnaissance, and subsurface work. Considerable administrative as well as geological survey experience. Wishes connection or position. Will go anywhere. Box E-425, The Oil and Gas Journal, Tulsa, Oklahoma.

THE RIGHT MAN: Can you fill the position you have open from the qualifications listed in this column. Men are always looking for an opportunity to improve themselves. Use a "Help Wanted" Journal classified advertisement to find the men you need. See box heading for classified rates or write The Oil and Gas Journal.

LEASE SERVICE

RECORD TAKE-OFF, available. Listing all Oil leases and assignments as recorded in Grant County, at Carson, North Dakota. Giving complete information. Also monthly continuations made. Write P. O. Box 344, Carson, North Dakota.

ROYALTIES

MONTANA ROYALTIES

Millions of acres now leased by world major companies, with huge drilling pla. in prospect. For booklet describing Mon tana geology and oil development, write Landowners Royalty Company, Box 1225 Great Falls, Montana.

GET TOGETHER: Both Capital and Roy alties are available. If the investment prop osition you want isn't listed in this column use a Journal classified advertisement to find it. See box heading for classified rates or write The Oil and Gas Journal.

LEASE AND DRILLING BLOCKS

MANUFACTURER'S Agent, in Rocky Mountain Area, desires additional Oil Pro duction items. Box E-428, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Producing oil lease with fur ther drilling possibilities. If interested write Acme Equipment Co., Inc., 126 S. Clinton St., Chicago 6, Illinois.

I HAVE 10,000 acres on Magnetomer and Gravity High in South Georgia. I can sup ply geophysical maps on this acreage to party interested in drilling deal or finance a drilling program. Wildcat acreage on good structure, gas and oil seepage, open for deal to use some **tax money** with excellent chance for shallow production. T. R. DAVIS, 700 Mosley Street, Vidalia, Georgia.

FOR SALE: Oil and Gas Leases in shal low territory. If interested in a good de velopment proposition near oil producing wells write or wire W. P. Harley, Bowling Green, Ky.

CAPITAL immediately available for geo logically attractive Drilling deals and oil producing property. Send full particulars. Box E-434, The Oil and Gas Journal, Tulsa, Oklahoma.

OFFERING LARGE block of southern States timber and grazing land with oil possibilities. Box E-426, The Oil and Gas Journal, Tulsa, Oklahoma.

INVESTIGATE Activity, Russell, Texas (Leon County), area. Then if interested participating in development write Box E-429, The Oil and Gas Journal, Tulsa, Okla.

COCHISE COUNTY ARIZONA drilling block 10,000 acres for 5000 ft. test. No bonus. G. J. Stumpff, Box 1107, Goodyear, Arizona.

LEASES ROYALTIES
Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited

B. D. BUCKLEY
6835 Delmar Ave., St. Louis 5, Mo.

WANTED
OIL INTEREST

I am in a position to furnish oil country tubular goods: casing, tub ing, etc., for interest in well for depth up to and including 6,000 ft. Wire or call collect your offer to

DAVID A. SCHLACHTER
6105 Del Norte Lane, Emerson 6026
DALLAS, TEXAS

LEASE AND DRILLING BLOCKS

INTERESTED in drilling several wells not over 4,000' in North Texas by December 15th. Give complete description and full details, Box 4343, Dallas, Texas.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

UNIT No. 1: N½SE¼, SW¼SE¼ of Section 14, Township 2-North Range 1-West, containing 120.00 acres, more or less, the same being within the ceded portion of the Shoshone or Wind River Indian Reservation, Fremont County, Wyoming. Unit No. 2: NE¼ of Section 14, Township 3-North, Range 1-West, containing 160.00 acres, more or less, the same being within the ceded portion of the Shoshone or Wind River Indian Reservation, Fremont County, Wyoming. Brinkerhoff Drilling Co., 804 Continental Bldg., Dallas 1, Texas.

OIL LEASE—4½ forties in Beauregard Parish, Louisiana, deep pay area, between three shallow exploratory "drys," presently leased. Lease to reliable company, or, bona fide drilling proposition considered. No mail or telephone inquiries. Alice Dickinson et al., Lake Arthur, La.

160 ACRE offsets and semiproven leases located in Stephens, Caddo and Grady Counties, Oklahoma. Small bonus and a well. Average depth 6000 to 8000 ft. This offer only to those experienced and regularly engaged in the oil business. J. S. Graham, Box 572, Chickasha, Okla.

LOOKING FOR A LEASE? There will be over 40,000 wells drilled this year. If you are looking for a lease, drilling block, or drilling deal and haven't found it in this column, or if you have a lease or drilling block you want drilled, a Journal classified advertisement can find an interested party. See box heading for classified rates, or write The Oil and Gas Journal.

FOR SALE—MAPS

NORTH DAKOTA MAPS—Base Map of North Dakota: County outline, Township and Range, location of wells and Operators name with total depths. Oil and Gas Fields. 1" = 8 miles. Price $5.00. COUNTY MAPS: Fee ownership and lease with expiration dates. Scale 1" = 4,000 Ft. Northwest Mapping Co., 117½ Fourth St., Bismarck, North Dakota.

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1906. Oil-Gas (all states). Business, Real Estate, Legal Forms, Leases, Revised With Government Regulations, Commercial Printing. Catalog and Samples on request. Burkhart Printing & Stationery Company, 115 South Vincinnati, Tulsa 3, Oklahoma.

BUSINESS OPPORTUNITIES

ATTENTION—MANUFACTURERS

Will sell outright, Patent #2,527,456 covering torque and or tension measuring means for tong arms. Box E-409, The Oil and Gas Journal, Tulsa, Oklahoma.

WANT
N. Y. EXPORT REPRESENTATION?

Long established and well known oil well equipment manufacturer who has maintained N. Y. export office and sales personnel for many years, is now in position to handle additional representation in New York for high quality manufacturers of oil equipment items. If you're looking for increased export business, write for further information. All replies held in strict confidence.

Box E-359, The Oil and Gas Journal, Tulsa, Oklahoma

REAL ESTATE

LOWER Rio Grande Valley—60 acres, three miles from city, paved road, beautiful home facing lake, bearing citrus orchard, cotton land, three apartments, yearly income about $15,000. Box E-404, The Oil and Gas Journal, Tulsa, Okla.

SPACE IS NEEDED: A Journal display classified advertisement is the quickest way to rent or sell your real estate. In the present period of expansion oil industry firms urgently need the space you have available. If it isn't listed here, you may also find it by stating your needs in these pages. For classified rates see box heading or write The Oil and Gas Journal.

FINANCING

YOUR FINANCING PROBLEM can be solved at moderate cost. For details write Box E-241, The Oil and Gas Journal, Tulsa, Oklahoma.

RANCHES and FARM LANDS

MISSISSIPPI AND ALABAMA RANCHES

7,700 acres. Without a doubt the best ranch in the South. Rolling Black Prairie land, 90% open or better. Watered by 9 overflowing wells and a limerock everflowing creek. 16 pastures. Land all mineralized. Capacity 3,000 mother cows. $50,000 new ranch home. Paved highway. 120 miles to Birmingham or Montgomery. Owner selling on account of health. This is a dream and won't be on the market but a few days. Shown by appointment. Other ranches, large and small.

William L. Douglass, Rancher and Licensed Real Estate Broker
Telephone 956—Box 71, Columbus, Miss.

RANCHES and FARM LANDS

EQUIPMENT MEN

(Continued from page 124)

Whitmire Named Sales Engineer for Regan Forge

B. WHITMIRE

Dick Regan, sales manager for Regan Forge & Engineering Co., recently announced the addition of Bill Whitmire to the Regan staff as a sales engineer with headquarters in Bakersfield, Calif.

Whitmire is a graduate in petroleum engineering from the University of California. He acquired valuable experience as a field engineer for the Gulf Coast Division of Stanolind Oil & Gas Co., and has been more recently employed by Camco, Inc., Houston.

Central Area

(Continued from page 115)

ILLINOIS SUCCESSFUL WILDCATS

Clay County: Herman Graham 1 McGee, S½ SE NE 27-5n-6e, IP 460 bbl., McClosky 2,772-79 ft., TD 2,779 ft. (extension Toliver pool).

White County: Oil Management, Inc., 1 Calvert, NE NE SE 31-5s-10e, IP 3 bbl., Biehl 1,838-44 ft., TD 1,847 ft. (extension Epworth pool).

ILLINOIS WILDCAT FAILURES

Bond County: J. W. Everhart and Ashland Oil & Refining Co. 1 Poland, NW SW NW 17-4n-2w, dry, TD 1,163 ft.

J. W. Everhart and Ashland Oil & Refining Co. 1 Harnetiaux, NW NW SW 18-4n-2w, dry, TD 1,167 ft.

Christian County: Collins Brothers 1 Gordon, SE NE NW 27-14n-1e, dry, TD 2,350 ft.

Clay County: Sun Drilling Co. 1 Kessler, NW SE SE 5-4n-8e, dry, TD 3,018 ft.

Clinton County: Frank Anderson & Son 1 Hulliung, SE SE NE 33-1n-5w, dry, TD 2,101 ft.

John Dunnill et al 1 Hilmes, NW SE NW 5-2n-3w, dry, TD 1,461 ft.

Coles County: A. J. Slagter, Jr., 1 Eichelberger, NW NW NW 18-11n-8e, dry, TD 2,196 ft.

Gallatin County: C. E. Brehm 1 Wilson, SW SW NE 20-8s-10e, dry, TD 2,867 ft.

Hamilton County: D. H. Bolin 1 Hart, SW

SE SE 14-4s-5e, dry, TD 3,448 ft.
Ashland Oil & Refining Co. et al 1 Schooling Unit, NW NE SW 14-5s-6e, dry, TD 3,434 ft.
D. H. Bolin 1 Poppins, SW SW NW 22-6s-7e, dry, TD 3,321 ft.
Jasper County: Aurora Gasoline Co. 1 Rudd, NW NE NE 17-5n-14w, dry, TD 2,925 ft.
Perry County: T. S. Doran 1 Matlavish, NE NE SE 36-4s-2w, dry, TD 1,603 ft.
Richland County: George Pappas et al 1 Chaplin Community, SE SW NW 24-3n-10e, dry, TD 3,281 ft.

INDIANA SUCCESSFUL WILDCAT

Knox County: Morgan Coal Co. 1 Powell, Military Donation 81-3n-8w, IP 5 bbl., Rosiclare 1,446-54 ft., TD 1,454 ft.

INDIANA WILDCAT FAILURES

Daviess County: W. Hostettler 1 Evans, W½ SW SW SW 26-5n-5w, dry, TD 1,700 ft.
Gibson County: Kennard Oil Co. 1 Paulson, SE NW SE 15-2s-10w, dry, TD 2,165 ft.
A. W. Cherry 1 Schaeffer, SW SW NE 8-4s-10w, dry, TD 2,363 ft.
Jennings County: C. W. Steed et al 1 Maschines, SE SE NE SW 29-6n-7e, dry, TD 1,480 ft.
Knox County: G. C. Parker 1 Freeland, NE NW SW 3-1n-8w, dry, TD 1,574 ft.
S. D. Jarvis 1 Holman, Sur. 3-1n-9w, dry, TD 1,560 ft.
Skiles Oil Corp. 1 McKinley, Military Donation 130-3n-8w, dry, TD 1,482 ft.
N. Nubert 4 Jackson, SW SE SE 12-4n-8w, dry, TD 1,150 ft.
Martin County: C. Clemens 1 Burris, SW NW SW 1-1n-5w, dry, TD 1,042 ft.
Owen County: E. Michel 1 Ritter, NE NE NE 35-11n-3w, dry, TD 1,926 ft.
Posey County: V. R. Gallagher 1 Hunter-Hancock, NW NW SE 35-4s-13w, dry, TD 2,204 ft.
Sullivan County: E. J. Cunningham 1 Parker, NW NW SE 5-6n-10w, dry, TD 1,851 ft.
Luttell-Everhart-Ashland 1 Phillips, SE SE NW 18-7n-9w, dry, TD 2,718 ft.
Vanderburgh County: Skiles Oil Corp. 1 Burgdorf, SE SW NW 23-7s-11w, dry, TD 1,798 ft.
Boling et al 1 McHenry, NW NW NW 27-5s-11w, dry, TD 2,725 ft.

WESTERN KENTUCKY SUCCESSFUL WILDCAT

Webster County: T. J. Pate et al 1 Adamson, SL NW SW NE 20-N-23, IP 3 bbl., Pasadena 1,430-40 ft., TD 2,665 ft. (New pay zone Bald Knob pool).

WESTERN KENTUCKY WILDCAT FAILURE

Daviess County: K & H Drilling Co. 1 Rone, WL SE NE SE 7-P-27, dry, TD 2,091 ft.

MICHIGAN WILDCAT FAILURES

Allegan County, Allegan Township: Cook Drilling Co. 1 Adams, SW NW NW 6-2n-13w, Traverse 1,465 ft., dry, TD 1,473 ft.
Casco Township: Louis Zellman 1 Bolles & Harris, NW NE SW 13-1n-16w, Traverse 1,168 ft., dry, TD 1,217 ft.
Fillmore Township: W. D. Gannett 1 Brink, NE NW SE 31-4n-15w, Traverse 1,503 ft., dry, TD 1,541 ft.
Bay County, Gibson Township: W. B. Stewart and Walhalla Oil Co. 1 Barbour et al, SE NE SW 26-18n-3e, Dundee 2,873 ft., dry, TD 3,061 ft.
Clare County, Arthur Township: H. E. Bell, W. B. Stewart and Basin Oil Co. 1 DeWitt, SE NE NE 32-18n-3w, Dundee 3,950 ft., dry, TD 4,200 ft.
Gratiot County, North Star Township: Leonard Oil, Inc. and Leonard Drilling Co. 1 Gearig, NE NW NW 28-10n-2w, Dundee 3,079 ft., dry, TD 3,180 ft.
Isabella County, Lincoln Township: W. R. Swetland 1 Gehret, SE SE NW 12-13n-4w, Dundee 3,690 ft., dry, TD 3,710 ft.
Kent County, Sparta Township: C. N. Crawford 1 Zwyghuizen, SW SW NE 27-9n-12w, Dundee 2,554 ft., dry, TD 2,686 ft.
Ottawa County, Jamestown Township: W. H. Strickler and Ford Oil Co. 1 Kline, NW NW NW 31-5n-13w, Traverse 1,673 ft., dry, TD 1,683 ft.

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Permian Basin

(Continued from page 116)

east of the field boundary. In Roberts County, the Sinclair 7 Lips flowed 12,000,000 cu. ft. of gas per day following 500 gal. of mud acid through perforations 8,574-8,614 ft. Estimated open flow of this well is 50,000,000 cu. ft. daily.

On the southwestern flank of the Anadarko basin, The Texas Co. has made location for an 8,000-ft. wildcat to explore the deep production possibilities of a previously untested area of Hutchinson County. Location of Texas 1 Holt is in Section 52, Block 5-T, T&NO Survey, 19 miles northeast of present Panhandle field production.

SOUTHEASTERN NEW MEXICO

Aurora Gasoline Co. 1 Davis, Lea County Permian strike, completed flowing 30 bbl. of oil an hour from open hole between casing at 4,449-69 ft., total depth.

Douglas & Ritchie 1 State, wildcat northwest of the Bagley field, prepared to test oil shows in the San Andres limestone between 4,060-4,131 ft. The well was projected to 11,500 ft. as a Devonian exploration.

Magnolia Petroleum Co. 1 Black, west of the Denton field, was running casing to 11,503 ft. following a successful drill-stem test at 11,445-11,503 ft. Recovery was reported to be 1,510 ft. of heavily oil and gas-cut mud and 2,200 ft. of oil and gas-cut water blanket. The oil and mud was estimated to be 60 per cent oil of 43° gravity.

Los Nietos 1 Elliott-Federal, northeast of the Gladiola field, was pulling core from 11,928 ft., total depth.

Forest Oil Co. et al 1 H. L. Lowe, wildcat discovery midway between Gladiola and Denton fields, prepared to make completion tests from perforations at 10,142-52 ft. in the Wolfcamp. Total depth was 13,147 ft. in the Devonian.

SOUTHEAST NEW MEXICO WILDCAT FAILURE

Malco, Reesler, and Yates 114 State, 25-18s-27e, dry, TD 6,014 ft., elev. 3,555 ft., San Andres 2,060 ft.

LEGAL

Sealed bids for Oil and Gas Mining Leases on restricted tribal and allotted lands of the Fort Berthold Indian Reservation, North Dakota, will be received at the Office of the Superintendent of the said reservation, Elbowoods, North Dakota, until 4:00 P. M. Central Standard Time, on November 15, 1951, and will be opened immediately thereafter in the presence of such bidders as may attend. This sale will be conducted under regulations as amended and promulgated by the Secretary of the Interior, 25 CFR 189, (Act of March 3, 1909, 35 Stat. 781, 783; 25 U. S. C. 396), governing the leasing of allotted land and 25 CFR 186 (Act of May 11, 1938, 52 Stat. 347; 25 U. S. C. 396 a-f), governing the leasing of tribal land. The lands involved in this sale are located in Townships 151 North and 152 North, Ranges 94 West and 95 West, McKenzie County, North Dakota, which is located in the Fort Berthold Indian Reservation. There are approximately 17,290.86 acres of allotted lands available for lease as a single block at so much per acre bonus. For full particulars and additional information, such as description of lands, terms of leases, etc., call or write the Superintendent of the Fort Berthold Agency, Elbowoods, North Dakota. R. W. Quinn, Superintendent.

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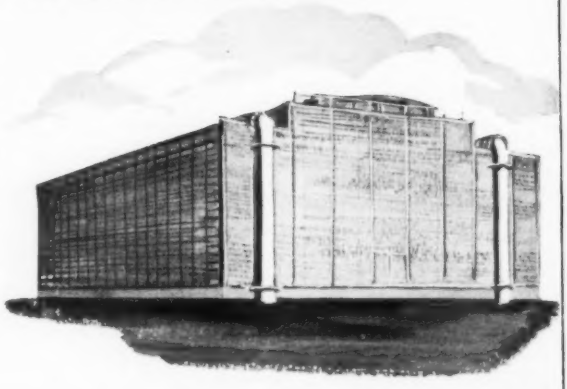
ECONOMICAL, HIGHLY EFFECTIVE

New CORROSION CONTROL

FOR COOLING TOWERS

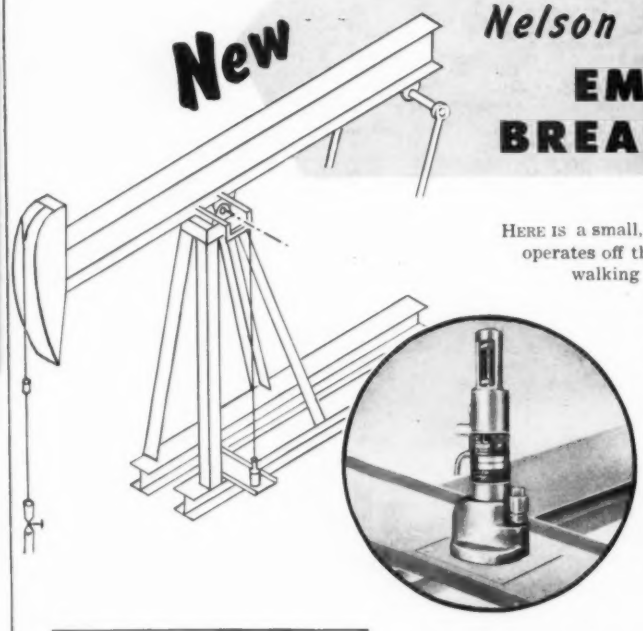
WRIGHT offers new and improved chemicals to solve the cooling tower corrosion-control problem effectively — particularly where certain contaminates are found. Because of the synergistic properties of these chemicals, excellent results are obtained at a moderate cost.

Send for complete information or contact the Wright Field Engineer closest to you. A complete survey will be made and a proposal covering our recommendations and estimated costs will be submitted to you.



New

Nelson Walking Beam EMULSION BREAKER PUMP



HERE IS a small, compact and inexpensive pump that operates off the walking beam. Each stroke of the walking beam activates the piston to inject a predetermined amount of emulsion breaker fluid into the well casing. This pump is compact with air-tight, dust-proof piston-rod packing. The stroke can be adjusted from zero to full, although the piston works to the extremity of the discharge stroke regardless of the stroke adjustment. Sizes $\frac{1}{4} \times 1\frac{1}{2}$ and larger (adjustable stroke). Displacement each delivery stroke 0.07 cubic inches. Send for bulletin.

Wright CHEMICALS

WRIGHT CHEMICAL CORPORATION

Specializing in Water Conditioning

GENERAL OFFICE AND LABORATORY—615 W. Lake Street, Chicago 6, Ill.

OFFICES IN PRINCIPAL CITIES

Sole Distributor of Nelson Chemical Proportioning Pumps

Partial List of Horton Structures for the Petroleum Industry

- Horton Floating Roofs
- Horton Vaporspheres
- Hortonspheres
- Hemispheroids
- Hortondome Roofs
- Flat Bottom Tanks
- Pressure Vessels
- Refinery Towers
- Elevated Tanks

The five 3,000-bbl. Hortonspheroids pictured above were recently built for the Sunray Oil Corporation to store natural gasoline at its absorption-type natural gasoline plant near Snyder, Texas. This plant is a cooperative project operated by 35 companies and 60 individuals in the Scurry County oil field.

In storing natural gasoline or other volatile hydrocarbons, Hortonspheroids protect the volatility and the octane rating; they substantially reduce the hazard of fire; and—most important in today's world of critical shortages—they offer a more efficient utilization of steel. Hortonspheroids can be built in capacities up to 120,000 bbls., thereby reducing the number of piping connections, vents and other fittings required.

For more information about these highly efficient, thoroughly economical pressure storage tanks—write our nearest office.

The Snyder gasoline plant of the Sunray Oil Corporation is designed to process 70 MCF per day and to recover 230,000 gallons per day of propane; 145,000 gallons per day of butane; 30,000 gallons per day of isobutane; and 142,000 gallons per day of 18-lb. R.V.P. natural gasoline. The gas is gathered from 850 wells located on 35,000 productive acres in the Kelly-Snyder area.

CHICAGO BRIDGE & IRON COMPANY

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PENNSYLVANIA

Atlanta, 3 ..... 2154 Healey Bldg.
Birmingham, 1 ..... 1536 North 50th St.
Boston, 10 ..... 1025—201 Devonshire St.
Chicago, 4 ..... 2128 McCormick Bldg.
Cleveland, 15 ..... 2204 Guildhall Bldg.
Detroit, 26 ..... 1514 Lafayette Bldg.
Houston, 2 ..... 2119 National Standard Bldg.
Los Angeles, 17 ..... 1523 General Petroleum Bldg.
New York, 6 ..... 3347—165 Broadway Bldg.
Philadelphia, 3 ..... 1615—1700 Walnut Street Bldg.
Salt Lake City, 4 ..... 525 West 17th South St.
San Francisco, 4 ..... 1554—200 Bush St.
Seattle, 1 ..... 1325 Henry Bldg.
Tulsa, 3 ..... 1606 Hunt Bldg.
Washington 6, D. C. ..... 1139 Cafritz Bldg.

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Ateliers et Chantiers de la Seine Maritime, Paris, France
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Each trip to each rig is planned so the right bits will be available on the rig floor as needed.

This is possible because Hughes field service representatives are intimately familiar with drilling conditions and bit requirements of their respective areas.

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